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A Braun

SPECIES FILICUM.

SPECIES FILICUM;

BEING DESCRIPTIONS OF THE KNOWN FERNS, PARTICULARLY OF SUCH AS EXIST IN THE AUTHOR'S HERBARIUM, OR ARE WITH SUFFICIENT ACCURACY DESCRIBED IN WORKS TO WHICH HE HAS ACCESS;

ACCOMPANIED WITH NUMEROUS FIGURES:

BY

SIR WILLIAM JACKSON HOOKER, K.H.,
D.C.L. Oxon., F.R.S., F.A.S., and F.L.S.;

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VOL. III.

CONTAINING

LOMARIA—ACTINIOPTERIS.

PLATES CXLI.—CCX.

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PLATES CXLI.—CCX.

SPECIES FILICUM.

Subord. V.—LOMARIEÆ.

Sori linear and continuous, or interrupted and oblong, superficial, transverse with the primary veins, parallel with and near the costa, or more or less remote from it, sometimes, from the great contraction of the fertile frond, occupying apparently the whole disc, and thus extending to the margin, involucrate. *Involucre* plane or vaulted, formed by an expansion or dilation of the margin (as in several true *Lomariæ*), more or less membranaceous; or attached to the disc, opening towards the costa.—*Tufted, or furnished with a more or less elongated* caudex *or* rhizome; *inhabiting warm and tropical countries, rarely extending to arctic or antarctic regions.* Fronds *simple or compound.* Veins *free, simple or forked, or anastomosing.*

The limits of this group or suborder are not easily defined. What I consider the type of this group, *Lomaria*, Presl refers to his *Adianteæ*, corresponding with our *Pterideæ;* and I had myself, as may be implied in my remarks upon *Pterideæ* (vol. ii. p. 1), intended following him; but a more careful investigation of several species of *Lomaria* shows that they gradually depart from the Pteroid character, and so completely merge into *Blechnum*, that Mettenius and others now refer *Lomaria* to *Blechnum*, while Presl, in his 'Epimeliæ Botanicæ,' equally constitutes of *Lomaria*, Willd., and the old genus *Blechnum*, a section or suborder (*Blechnaceæ*), and, including *Sadlera* and *Salpichlæna*, forms no less than ten genera of them! Mettenius includes most of our *Lomarieæ* in his tribe *Asplenieæ*. Mr. J. Smith, in his latest work, 'Catalogue of Cultivated Ferns,' and Mr. T. Moore, 'Index Filicum,' seem to take the most correct and natural view of this group; but the former includes *Brainea*, one of the *Nudisori*, and the latter excludes *Woodwardia*. Fée takes into his *Lomarieæ*, *Acropteris*, Lk. (Asplenium septentrionale, *L.*), *Leptochili* species, Fée, and *Hymenolepis*.

1. Lomaria, *Willd.*

(Hook. Gen. Fil. tab. LXIV. B.) Stegania, *Br.* Blechnum, *Mett.* Blechni, Acrostichi, Onocleæ, Salpichlænæ, Hemionitidis *sp. Auct.* Parablechnum, Mesothematis *sp.* Orthogramma, Lomaridium, *Pr.* Plagiogyria, *Mett. Plagiog. t.* 15.

Sorus linear, continuous, parallel with and generally contiguous to the costa; sometimes, by the contraction of the fertile pinnæ or segments, apparently marginal, and then occupying nearly the whole under surface of the frond. *Involucre* formed of the revolute and membranaceous margin of the frond itself, often fornicate, or it is a little intramarginal and more or less plane.—*Tropical or extratropical.* Roots *tufted, fibrous.* Caudex *scarcely any, or more or less elongated, even subarborescent, sometimes scandent.* Fronds *of two kinds (dimorphous), varying much in size, generally subcoriaceous, fascicled, stipitate, simple or pinnatifid, usually deeply so, or pinnate, rarely bipinnate.* Veins *free, simple or forked, at least in the sterile fronds.* Sori *in a continuous elongated line, running transversely with the veins.* Involucre *often forced back and concealed by the mass of capsules, and then having very much the appearance of an Acrostichoid Fern, especially of* Lomariopsis, *Fée.*

Mr. J Smith observes ('Genera of Ferns,' p. 55) that this is a very natural genus, containing a considerable number of species of great uniformity of habit, which is quite true to a certain extent; for, as already observed, there are particular species—and our own *Lomaria Spicant* of Linnæus is one—which vacillate between *Lomaria* and *Blechnum*, according to the views of authors. But such or similar gradations are common to other genera of Ferns, and if made an excuse for abolishing a long-established one the number of genera would undergo a great reduction. These species, it may be observed, whose fructifications extend to the setting-on of the involucre at the margin of the fertile frond, have those fronds the most contracted.

I am not disposed to retain *Plagiogyria* separate from *Lomaria*, although constituted by a botanist by no means addicted to establishing new genera on slight grounds. It has peculiarities* in the base of the stipes and in the presence of certain glands called by Mettenius *aerophoræ*, but, notwithstanding this structure, and even should the capsules in all the species referred to *Plagiogyria* prove to be heterogyrate (the ring of the capsule oblique as in many *Cyatheaceæ*, not perpendicular with the axis) yet the habit and sori are so entirely in accordance with true *Lomaria* that, unless the student has the opportunity of examining very perfect specimens (perfect, too, in what is so often wanting, the *base* of the stipes), or unless he examines the structure of the annulus of the very minute capsules under the high power of a microscope, the genus cannot be

* If the sori are constantly as represented by Mettenius (Plagiog. l.c. fig. 6) *Plagiogyria* would hold nearly the same relationship to *Lomaria* that *Pellæa (Allosorus Pr.)* does with *Pteris*.

identified. Kunze, who first recognized the physiological differences, only proposed to form a group or section, under the name of *Plagiogyria*, but even that would be found inconvenient to retain in a work whose main object is to assist the tyro in the verification of genera and species; and natural habit is often a safer guide than minute microscopic characters.

* *Fronds mostly undivided* (*rarely subpinnatifid*).

1. L. *Patersoni*, Spr.; caudex a short rhizome, fronds tufted a foot or more long subcoriaceous erect, *sterile* ones lanceolate shortly and rather suddenly acuminate subsinuate crenato-dentate attenuated below shortly stipitate, *fertile* ones linear-elongate, both of them undivided or rarely pinnatifid above the middle with a few (1–6–7) elongated segments, sori occupying the whole length of the frond, stipes 1–2 inches long chaffy only at the base.—*Spreng. Syst. Veget.* iv. *p.* 62. *Kunze in Linnæa, v.* 23. *p.* 261. *Schkuhr, Fil. Suppl. p.* 69. *t.* 34. *Hook. Fil. Exot. t.* 49. *Hook. fil. Fl. Tasm.* 2. *p.* 141. Stegania Patersoni, *Br. Prodr. Fl. Nov. Holl. p.* 152. Salpichlæna Patersoni, *Fée, Gen. Fil. p.* 79. Blechnum Patersoni, *Metten. Fil. Hort. Bot. Lips. p.* 64.—Var. *pinnatifida*; segments 3–8.

Hab. Port Dalrymple, Tasmania, *Paterson*. Victoria, South Australia, frequent on the shady banks of the Broadribb and Cabbage-tree Rivers, and at Sealer's Cove, *Ferd. Mueller*, 1854–5; and β, Bunnip, Bunnip River.—One of the rarest of the genus *Lomaria*; as far as we at present know, inhabiting only Tasmania (and there, we believe, found only by the late Mr. Paterson), and the Colony of Victoria in N.S. Wales, where it has recently been found by the indefatigable Dr. Mueller. It is remarkable that native specimens are described as having all entire fronds, and so it is with most of our *native* specimens; but in cultivation they occasionally become partially divided and pinnatifid towards the apex, as shown in our figures in 'Filices Exoticæ.' Mettenius refers this plant to *Blechnum*; Fée to *Salpichlæna*. On some of my specimens, flattish, orbicular, marginal discs are seen on the upper surface of the sterile fronds, terminating the veins. The fact of the *L. Patersoni* bearing partially pinnatifid fronds in cultivation, might throw some doubt on the validity of the species, at least upon the correctness of considering the simple frond as the normal state of the plant. Already I stand corrected for having, in the 'Filices Exoticæ,' under my description of *L. Patersoni* (in note), described a *Lomaria Cumingiana* with simple fronds as a new species. Suites of specimens of *L. elongata*, a plant of extensive geographical range, have convinced me that it is merely a form or a young state of that variable plant, and as such will be described in this work. There the pinnatifid form is evidently the normal or perfect state of the species. The earlier specimens detected by Dr. Mueller were all, both the sterile and fertile fronds, quite entire; but he has since discovered the plant having the sterile fronds, only, pinnatifid, with two or three segments. But in a state of cultivation we find the fronds to vary, the fertile ones with two and three segments, the sterile ones with as many as seven or eight; yet even in that state it is very different from any species of *Lomaria* with which we are acquainted.

** *Sterile fronds pinnatifid* (*inferior segments sometimes free*). *Fertile ones either pinnatifid or very frequently pinnate.*

2. L. *elongata*, Bl.; caudex short subrepent, frond long-

stipitate coriaceous glabrous 1–2 feet and more long ovato-lanceolate acuminate pinnatifid (rarely lanceolate and undivided), segments few or many, of the *sterile frond* oblong-lanceolate acuminate subfalcate patent more or less approximate entire except at the point which is slightly serrated, at the base generally decurrent so as to form a lobe in the sinus of the margin often bearing white dots, terminal segment the largest, lowest segments often suddenly reduced to mere lobes, *fertile* segments remote erecto-patent linear decurrent so as to form a narrow wing in the sinuses, sori continuous on the wings as well as segments, stipes long more or less scaly at the base.—*Blume, En. Fil. Jav.* ii. *p.* 201. "*Moritz, Verz. d. Zoll. Pl. Jav. n.* 236." *Hook. fil. Fl. N. Zeal.* ii. *p.* 29. L. punctata, *Bl. En. Fil. Jav. p.* 201. *Kze. in Schkuhr Fil. Suppl.* ii. *t.* 137. L. Colensoi, *Hook. fil. in Ic. Pl. t.* 627 *and* 628. L. heterophylla, *Colenso, MSS.* (*not Desv.*). L. coriacea, *Brackenr. Fil. U. St. Expl. Exp. p.* 122? (*not Schrad.*).—Var. *β*, with undivided fronds. L. Cumingiana, *Hook. Fil. Exot. in note under* L. Patersoni, *t.* 43. (Tab. Nostr. CXLIII.)

Hab. Java, *Blume, Zollinger, Thos. Lobb.* Ceylon, *Mrs. Genl Walker.* Neilgherries, *Gardner, M'Ivor* (singular variety, with segments a span long, upper ones sterile and leafy, lower ones narrow-linear and fertile, except their apices, which are lanceolate, leafy and sterile, so that these segments, in shape and appearance, resemble the petiolated leaves of *Alisma Plantago*). Island of Aneiteum, Ovalau and Ingau (Feejee group), *Milne, Brackenridge.* New Zealand. Northern and Middle Islands, *Colenso, Sinclair, Lyall, Joliffe.*—*Var. β.* fronds undivided or nearly so. Luzon, *Cuming, n.* 200. Ovalau, Feejee group, *Milne* (Denham's Voyage in H M.S. Herald).—Few persons, on seeing Mr. Cuming's quite entire-fronded small *Lomaria*, as shown in our figure, Tab. CXLIII, would suspect it to be the same as some of our large New Zealand ones, with a frond two feet long, deeply pinnatifid, with segments more than an inch broad, and with the lower portion suddenly pinnated with ten or twelve diminutive pinnæ, or rather mere lobes, not half an inch long: such, however, is really the case. The number of segments on the frond is also extremely variable; where most numerous the fronds have no inconsiderable resemblance to *L. gibba* of Labill. The latter has, however, much more numerous and more crowded and serrated segments; terminal one not larger than the rest, generally smaller; the lower segments in the sterile plant narrower, and either straight or decurvedly falcate, and the texture is more membranaceous.

3. L. *melanocaulon*, Brack.; "stipes smooth black, fronds ovato-oblong acuminate glabrous pinnate at the base towards the apex deeply pinnatifid, *sterile* fronds with the pinnæ oblong-lanceolate acuminate subfalcate dotted at the margin crenated at the apex at the inferior base auriculate decurrent, terminal one longer, those of the fertile frond linear mucronate, involucres torn at the edge."—*Brackenr. Fil. U. St. Expl. Exp. p.* 122.

Hab. Mount Manijaijai, Luzon, Philippine Islands, *Brackenridge*.—"Related to *L. punctata*, Bl. (L. elongata, *Bl. and of this work*), but differing in its fronds being rounder at the base, and in the absence there of minute obtuse pinnæ; also in the greater length of its sterile pinnæ."—*Brack.*

I am unacquainted with this species, and I place it in the section with pinnatifid sterile fronds because the upper portion at least is said to be pinnatifid, and because of its relationship to *L. punctata*, Bl. (our L. elongata, *n.* 2).

4. L. *gibba*, Labill.; caudex stout 1–3 feet high (*Labill.*), frond 1½–2 feet long ovato-oblong acute coriaceo-membranaceous deeply pinnatifid with very numerous approximate serrated segments, those of the *sterile* frond linear acuminate entire decurvedly subfalcate generally decurrent at the base and forming a more or less distinct decurved lobe in the sinus, terminal one the smallest, segments of the *fertile* frond less gibbous or lobulate at the decurrent base than the sterile, "stipes paleaceous."—*Labill. Sert. Austr. Caledon. p.* 3. *t.* 4, 5.

Hab. New Caledonia, *Labillardière*, *C. Moore*. Isle of Pines, on margins of streams, and in Aneiteum, *M'Gillivray and Milne* (Denham's Voyage of H.M.S. Herald).—This must be a very fine species, of which I regret that my specimens, though a foot to a foot and a half long, do not exhibit stipes or caudex. Mr. C. Moore, as well as M. Labillardière, describes the Fern as arboreous, having a caudex 2–3 feet high. The fronds bear very numerous segments nearly a span long, very approximate both in the sterile and fertile plant. Labillardière has represented two states of the plant (t. 4, 5); the latter has the closest resemblance to our specimens, but the ear-like, decurrent base of the segments, especially in the fertile frond, is more distinct than in ours.

5. L. *discolor*, Willd.; caudex very stout ascending paleaceous especially at the extremity clothed with the bases of the old stipites, scales subulate fulvous dark-brown or black, fronds tufted at the apex of the caudex including the more or less elongated stipes 1–3 feet long erect coriaceous glabrous often tawny or reddish-brown beneath, *sterile* fronds broad-lanceolate shortly acuminate generally much attenuated at the base deeply pinnatifid almost to the rachis with numerous horizontally patent linear or linear-oblong subacute or acuminated segments varying much in length the base always the broadest, lowest segments often distinct and apart small, *fertile* fronds narrow-oblong elongated pinnated, pinnæ numerous approximated linear acute or obtuse more or less dilated at the base sessile, involucres much lacerated, stipes often dark-chestnut-brown even black in the fertile frond.—*Willd. Sp. Pl.* v. *p.* 293. *Hook. fil. Fl. Nov. Zeal.* ii. *p.* 30. Stegania discolor, *A. Rich. Fl. Voy. Astrol. Bot. p.* 87. Stegania falcata, *Br. Prodr. Fl. Nov. Holl. p.* 153. Onoclea discolor, *Sw. Syn. Fil. p.* 111. Osmunda discolor,

Forst. Prodr. n. 113. Hemiontis discolor, *Schkuhr, Fil. p.* 7. *t.* A. (*named* H. rufa *on the plate*). Onoclea nuda, *Lab. Fl. Nov. Holl* ii. *p.* 96. *t.* 246. Stegania nuda, *Br. Prodr. Fl. Nov. Holl. p.* 153. Lomaria lanceolata, *Hook. fil. Fl. Antarct.* i. *p.* 110 (*not Spreng*).

Hab. Throughout all the islands of New Zealand, abundant, *Forster, etc.* Lord Auckland's group and Campbell's Island, *J. D. Hooker* Tasmania, *Labillardière, Brown, R. Gunn, J. D. Hooker.* New Holland, *Sieber, Fl. mixta, n* 245; Stone Quarry Rock, Argyll Co., *Alt Cunningham;* Sealer's Cove, Victoria, *F. Mueller* —"It is generally," says Dr. Hooker, in his New Zealand Flora, "easy to distinguish this from *L. lanceolata* by the red colour of the under side of the frond, but this is not always the case" I may add, too, that it has much affinity with *L. attenuata*, Willd., especially the green-fronded state of the plant; nevertheless there are differences, which if not constant, yet are helps to recognize this species among them may be reckoned the more elongated and narrower form of the frond, tapering downwards, the great number of segments or pinnæ, and consequently the shorter and more compacted, and at the same time more robust habit The scales of the caudex are often black, the stipes, especially that of the fertile frond, deep chestnut-coloured or even black also; the pinnæ of the fertile fronds are sometimes more widely apart and destitute of fructification at the broad bases, giving a peculiar appearance well represented in Schkuhr, *l.c.*, the caudex is stouter and more ascending. yet much of this may be the effect of climate, and it may possibly be a more southern form of that variable species *L. attenuata*, luxuriating in the moist atmosphere of New Zealand.

6. L. *attenuata*, Willd.; caudex long horizontal stout very densely clothed with long subulate ferruginous chaffy scales, fronds remote upon the caudex stipitate broad-lanceolate 1–2 feet and more long acuminate much attenuated below coriaceous glabrous, *sterile* frond deeply nearly to the rachis pinnatifid below pinnate with the pinnæ often gradually diminishing in size till at the base they form minute lobes or tubercles, segments horizontally patent approximate long and sharply acuminate entire or subserrate the bases not decurrent, the sinus very narrow acute, *fertile* fronds pinnated, pinnæ linear a little remote sessile but not decurrent, the points apiculate, stipes short scaly.—*Willd. Sp. Pl.* v. *p.* 290. *Presl, Tent. Pterid. p.* 143. *Fée, Gen. Fil. p.* 68. Onoclea attenuata, *Sw. Syn. Fil. p.* 112 *and* 308. Blechnum attenuatum, *Metten. Fil. Hort. Bot. Lips. p.* 64. *t.* 3. *f.* 1–6. Lomaria decrescens, *Fée, Sme. Mém. des Foug. p.* 24. *t.* 9. *f.* 1. L. Meridensis, *Klotzsch in Linnæa*, xx. *p.* 345. L. circinata, *Boj. Hort. Maurit. p.* 406, *and in Herb. Hook.*

Hab. Mauritius, *Grœndal* (*Sie*), *Sieber, Syn. Fil. n* 20, *Wall Cat. n* 33, *Bojer, Sieber, n* 21 (L. variabilis, *Willd.*), *Hohnager and Bojer* Bourbon, *Herb Nostr. ex Herb. Mus. Par.* Tropical America West Indian Islands, St. Vincent (fronds 2½ feet long; one specimen with the lower half fertile, and narrow-linear pinnæ, upper half sterile, pinnatifid), *Rev. L. Guilding*, Dominica,

Dr. Imray; Cuba, *Linden*, n. 2019 (*Fée*), *C. Wright, Pl. Cub.* n. 864; Brazil, Organ Mountains, *Gardner*, n. 141 and 144; Columbia, *Triana*, n. 11; Antioquia, *Mr. Jervise;* Merida, *Moritz*, n. 297; Venezuela, *Funck and Schlim*, n. 979, *Fendler*, n. 308. Natal, *Gueinzius* (*fide Klotzsch in Linnæa*, xviii. p. 116). Society Islands, *Bidwill;* frond unusually large, with very numerous segments, very much resembling the *L. gigantea* of Kaulf., from the Cape. Raoul or Sunday (Kermadee) Islands, South Pacific, *Milne and M'Gillivray;* common form, but fronds tender, very green, segments very close, serrated. Aneiteum Island, *M'Gillivray and Milne;* a very remarkable form, especially in the sterile frond, of which the segments are very broad, nearly three-quarters of an inch, not tapering, but the same width throughout their whole length, singularly abrupt at the apex, where there is, in the specimens of both collectors, a deep notch, so as to be bifid. The colour is very dark blackish-green, as if the plant inhabited very wet localities. It may perhaps be considered a monstrosity. Ovalau, Feejee Islands, *Milne.* Norfolk Island, *All. Cunningham, Dr. M'William, Milne, C. J. Simmons, Esq., Dr. V. Thomson.*—If the stout, elongated caudex, clothed with dense, long, imbricated, fulvous, bright, chaffy scales, and the general form of the sterile and fertile fronds, and the very acuminated sterile and long fertile pinnæ, be attended to, this is an easily recognized species, closely, however, bordering upon *L. lanceolata*, Spr. *L. Meridensis*, Kl., according to a specimen from the author, I should consider identical with *L. attenuata.*

7. L. *pteropus*, Kze.; "frond coriaceous thin margined glabrous elliptical attenuated at each extremity, *sterile* deeply pinnatifid subsinuate at the base and very decurrent (*longissime decurrente*) into a short stipes, lower segments divergent, upper ones patenti-divergent approximate, all oblong acuminate apex rather obtuse, margin recurved subrepand, *fertile* on an elongated nearly scaleless stipes pinnated, pinnæ linear adnato-decurrent at the base, lower ones curved cuspidate, caudex creeping and as well as the ascending base of the stipites paleaceous." *Kunze, in Schkuhr's Fil. Suppl. p.* 97. *t.* 46. Acrostichum heterophyllum, *Raddi, Fil. Bras. p.* 5. *t.* 17, *and in Herb. Nostr.* (*but sterile fronds only*). L. attenuata, *Klotzsch in Herb. Nostr.*

Hab. Brazil: Mandiocca Woods, near Rio, *Raddi;* South Brazil, *Sellow.*—This is chiefly distinguished from *L. attenuata* by the confluent and decurrent short lower segments or pinnæ forming a broad wing to the upper portion of the stipes. The caudex, though elongated, is but laxly paleaceous; but in other respects it can scarcely be distinguished from *L. attenuata*, Willd., and of this work. Indeed, one of three specimens from Dr. Klotzsch has the base of the frond exactly as in the species last mentioned.

8. L. *Plumieri*, Desv.; tall, caudex elongated thick rugose nearly erect radicant paleaceo-squamose towards the apex, stipites subfasciculate but from different parts of the upper portion of the caudex naked, fronds ovato-lanceolate abrupt (or truncate) at the base, *sterile* ones deeply almost to the base pinnatifid coriaceo-submembranaceous, segments numerous from a dilated base broad-lanceolate moderately acumi-

nate quite entire horizontal rarely subfalcate the lower ones (scarcely shorter than those above them) sometimes a little deflexed all minutely and closely pellucido-punctate, veins rather distant simple or mostly once-forked, apices clavate extending to the margin and there glandular, pinnæ of the *fertile* frond linear elongated acuminate distant curved sessile and slightly decurrent 3-nerved, the involucre conspicuous set on as it were on the outer nerve which on the upper side forms a kind of fold and gives a narrow margin as if the insertion were intramarginal.—*α.* segments numerous approximate, the sinus very acute and narrow. L. Plumieri, *Desv. in Mag. Nat. Ber.* 1811, *p* 315. *Desv. in Mém. Soc. Linn.* vi. *p.* 288. *Pr. Tent. Pterid. p.* 142. *Fée, Gen. Fil. p.* 68. *Klotzsch in Linnæa*, xx. *p* 344. L. Martinicensis, *Spreng. Neue Entd.* 1822, *p.* 5. L. divergens, *Kze. in Linnæa*, ix. *p.* 57. *and* Blechnum divergens, *Mett. MSS. in Herb. Nostr.* Lomaridium Plumieri, *Presl, Epimel. p.* 155. Polypodium rigidis et acuminatis pinnulis, *Plum. Fil. t.* 90.—*β.* segments numerous distant, sinus broad acute in the centre.—*γ.* almost pinnate, segments sometimes few in number remote, the inferior base very decurrent but scarcely uniting with the segment or pinnæ below.

Hab *α* Martinique *Plumier*. Peru, *Pœppig* Columbia, *Moritz*, *n.* 233 (*in Herb Nostr. and Fendler*, *n* 309) Guadaloupe, *L Herminier n.* 2. Dominica, *Dr Imray*, *n.* 44. *β* Guiana, *Rich Schomburgk*, *n.* 1190 (*Klotzsch in Herb. Nostr.*). Brazil, shady wood by a small stream, Organ Mountains, *Gardner*, *n.* 142. *β* Rio, *Douglas*.—*γ* Peru, *Matthews*, *n.* 1798 segments large, 4 10). N. Granada, *Triana*, *n.* 1017 segments numerous, fronds large).—Kunze has well characterized this species under the name of *L. divergens* from Peruvian specimens of Pœppig, in the ninth volume of the 'Linnæa,' and has justly said of it, "Simulat *L. attenuata*, W." Here, however, the fronds are much longer and broader, abrupt or truncate in circumscription, at the base not attenuated. In the broader segments it more resembles *L. l'Herminieri*, but there the constriction at the base of the frond is still more remarkable than in *L. attenuata*. Plumier's plant, though quite likely to be the same as ours, is very imperfectly represented by that author, and the sterile fronds only were known to him.

9. L. *Mexicana*, Fée; "*sterile* fronds lanceolate terminating in a long hastate point, the inferior segments triangular arcuate ovoid and acuminate, stipes and rachis discoloured (*discolores*) naked and glabrous, young shoots are linear and entire, *fertile* fronds with segments (frondules?) linear spreading, indusium continuous opening entire, rhizome sinuous covered with lanceolate scales which are acuminate villous and loosely imbricated."—*Fée, 8me. Mém. des Foug. p.* 70.

Hab. Mexico, *Galeotti*, n. 6465; Totutla, Mirador, Huatusco, *W. Schaffner*, n. 100 (1854), growing on arborescent Ferns.—"Resembling *Lomaria Plumieri*." *Fée*.

10. L. *L'Herminieri*, Bory; "caudex elongated vertical rooting fusco-paleaceous, frond lanceolate coriaceous glabrous pinnatisect, *sterile* one abruptly and very much attenuated at the base, segments nearly opposite patenti-divergent falcate oblong rather obtuse dilated at the base subdecurrent veined paler beneath margin reflexed subrepand lowest 3 or 2 (rarely one) lobiform on each side transverse rounded, stipes short sparingly but at the base more paleaceous rufescent, *fertile* frond gradually attenuated at the base, the segments (pinnæ) alternate patent linear-falcate acute at the dilated base decurrent so as to form a winged rachis, stipes moderately long rufescent, at the base more densely paleaceous, involucres membranaceous at length reflexed, sori covering the whole back of pinnæ." *Kze.—Bory in litt. Kze. in Schkuhr Fil. Suppl. p.* 173. *t.* 73. Blechnum L'Herminieri, *Mettenius, Fil. Hort. Lips. p.* 54. *n.* 99 *ter, et n.* 2?

Hab. Guadaloupe, *L'Herminier*. Caracas, *Linden*, *n.* 193 *and* 161. Tovar, *Moritz*. Santa Martha, *Purdie*.—Possessing as I do samples of this Fern from L'Herminier (Guadaloupe), and from Linden and Moritz (Caracas), which are authorities for this plant, I can testify to the accuracy of Kunze's description and figure; but, except in the larger size, I do not see any character to distinguish it from some of the many forms of *L. lanceolata*: one of Linden's specimens (*n.* 161) is indeed the common form of that species. The lobed as well as winged stipes may be considered characteristic; but, as Kunze acknowledges, these lobes are sometimes reduced to one ("1–6"), and I scarcely think the entire absence of lobes would justify its being kept distinct from *L. L'Herminieri*. It is a satisfaction to have so excellent a figure as that of Kunze to enable us to identify the plant. Every one must form his own opinion as to the validity of the species.

11. L. *onocleoides*, Spreng.; caudex very long stout scandent (6–20 feet, *C. Wright*) rooting, the apices very scaly, fronds subterminal laxly cæspitose, stipites rather short smooth (not scaly), *sterile* fronds 1–1½ foot long narrow elongato-lanceolate subcoriaceous sharply acuminate the long apex entire gradually and narrowly attenuated below deeply pinnatifid almost to the costa subtriangulate-ovate acute horizontal slightly falcate numerous approximate, sinus very acute, inferior segments dwarf forming shallow lobes all entire, *fertile* fronds on longer stipites oblong abrupt at the base not attenuated pinnated, pinnæ rather remote linear acute, sori covering the whole under side of

the pinnæ, involucre large and obvious in an early state the opposite ones meeting at the back membranous. (Tab. CXLVI.)—*Spreng. Syst. Veg.* iv. *p.* 67. *Pr. Tent. Pterid. p.* 147. L. polypodioides, *Desv. in Mem. Soc. Linn.* vi. 288. L. fragilis, *Liebm. Fil. Mex. p.* 80. Blechnum onocleoides, *Sw. Syn. Fil. p.* 115. *Willd. Sp. Pl. p.* 409. Onoclea polypodioides, *Sw. Fl. Ind. Occ.* iii. *p.* 1595. Osmunda polypodioides, *Sw. Prodr.* 127. Spicanta onocleoides, *Pr. Epim. Bot. p.* 115.

Hab. On trees, interior of Jamaica, *Swartz.* Martinique. *Kohaut.* Mexico, *Schiede, Liebmann.* St. Vincent, West Indies, *Rev. L. Guilding.* Summit of Lomodel Gobo, Cuba, climbing trees with a caudex from 6 to 20 feet long, *C. Wright, n.* 864 (in part). Pasto, Ecuador, elev. 10,000 feet, *Jameson.*—This Fern I believe to be the true *Onoclea polypodioides* of Swartz; but though I here retain it as a species, in deference to the opinion of others, I am far from sure that intermediate states may not be found indicating a passage to *L. attenuata;* and it is not a little remarkable that one of my best-marked specimens, from Mr. C. Wright, found in Cuba, is accompanied by specimens bearing the same number, and which I have little hesitation in placing under *L. attenuata.* Indeed, M. Fée's *L. decrescens,* so well figured in his 7th Memoire on New Ferns, t. 9 (a Cuba plant), and that which I here bring under *L. onocleoides* from Pasto (Dr. Jameson), do seem to connect the two supposed species very intimately.

12. L. *gigantea,* Kaulf.; "fronds pinnate, pinnæ adnate all of them linear-setaceous, stipes paleaceous subcrinite."—*Kaulf. En. Fil. p.* 150.—Blechnum giganteum ("fronds glabrous epaleaceous pinnated, sterile pinnæ adnate linear long-acuminate subfalcate entire with elevated dots on the margin above, indusia suberose, stipes paleaceous below.") *Schlecht. Fil. Cap. p.* 36. *t.* 20 *and* 22. *f.* 1.—Var. sterile pinnæ (rather the segments of a *pinnatifid* frond) entire or pinnatifid. Lomaria heterophylla, *Desv. in Mag. d. Ges. Naturf. Fr. z. Berl.* v. *p.* 330. *Pappe and Raws. Syn. Fil. Afr. Austral. p.* 27. L. hamata, *Kaulf. En. Fil. p.* 150. L. decipiens, *Pappe and Raws. Syn. Fil. Afr. Austral. p.* 29?

Hab. Cape of Good Hope: Table Mountain, *Bergius, Dr. Alexander, Mund, Carmichael, Harvey,* Uitenhage, *Zeyher;* Forests of George, *Drège* (common form, but with the name *L. heterophylla*); Albany, *Atherstone;* Natal, *Gueinzius;* Macalisberg, *Sanderson.*—Var. *heterophylla,* Cape (*Desvaux*), *Mund;* sterile only.—I give the specific character above of this species, both of Kaulfuss and Schlechtendal (which are a little at variance), because there are authors who are entitled to much respect; but if it had not been for such authority, I should have been led to consider this a luxuriant local form of *L. attenuata,* Willd. Indeed, Schlechtendal himself alludes to the close affinity, but says of his *gigantea*. "*L. attenuatæ,* Wild., valde affinis est hæc species, quæ differt pinnis multo longioribus et angustioribus, linearibus elongato-acuminatis pinna terminali breviore, stipite ad basin latioribus et majoribus paleis obsito." All this is very correct if an extreme form of *L. gigantea* be

taken, but does not hold good with the majority of my Cape specimens. *L. hamata*, Kaulf., Schlechtendal suspected to be the same species, and Pappe and Rawson confirm that opinion. The *L. heterophylla*, Desv. and Schlecht., is merely an abnormal form analogous to the var. *Cambricum* of *Polypodium vulgare* in England, and only affects the sterile frond.

13. L. *lanceolata*, Spr.; caudex often none apparent but sometimes by the union of the bases of the old stipites a progressive and even suberect one more or less scaly is formed 4–5 inches to a span long bearing several fronds in a tufted manner from near the apex, these are 1–2 feet long stipitate glabrous green on both sides, *sterile* ones broad lanceolate acuminate tapering to a narrow elongated base deeply near to the costa pinnatifid, segments approximate broad-oblong spreading falcate obtuse entire or serrated lowest ones much abbreviated, *fertile* fronds generally smaller than the sterile ones oblong pinnated with linear rather lax often finely acuminated pinnæ, stipites 4–6 inches long brown or almost black paleaceous with long narrow scales at the base.—*Spreng. Syst. Veget.* iv. *p.* 62. *All. Cunn. Bot. N. Zeal. in Hook. Comp. to Bot. Mag.* ii. *p.* 263. *Hook. Ic. Plant. t.* 429. *Hook. fil. Fl. Nov. Zeal.* ii. *p.* 31, *and Fl. Antarct.* i. *p.* 110. Stegania lanceolata, *Br. Prodr. Fl. Nov. Holl. p.* 152. *Endl. Prodr. Fl. Norfolk, p.* 11 (*may not this rather be* L. attenuata, *which has been met with by several voyagers in Norfolk Island?*). Lomaria obtusata, *Labill. Sert. Nov. Caled. p.* 4. *t.* 6.

Hab. Tasmania, *Brown, R. Gunn, J. D. Hooker;* and in New South Wales, Sealer's Cove and in Caverns of Mount Gambia, Victoria, *Mueller* (ordinary forms). New Zealand, Northern and Middle Island (Akaroa), *Colenso, J. D. Hooker, Lyall* (ordinary forms), *All. and R. Cunningham.* On some of the smaller specimens Mr. All. Cunningham has remarked, "allied to Mr. Brown's *Stegania minor*." Auckland and Campbell's Islands, in woods close to the sea, abundant, *J. D. Hooker.* New Caledonia, *Labillardière* (ordinary form). Norfolk Island, *Ferd. Bauer?* Society Islands, *Biduill*, ordinary size and form, with a very stout subarborescent caudex a span long, nearly erect, very scaly, and the fronds unusually coriaceous. Loyalty Islands, *Sir Geo. Grey* (large).—This seems to be a generally acknowledged species, and yet it is difficult to say in what its essential character consists, so insensibly does it seem to pass into some forms of *L. attenuata* and *discolor*. It is perhaps best recognized by its usually smaller size, uniform rather bright green colour, and shorter and blunter segments of the fronds. Happily we can refer to two very characteristic figures of the ordinary state of this Fern, in the 'Sertum Austro-Caledonicum,' where the caudex is also given, and to the 'Icones Plantarum Rariorum.'

14. L. *blechnoides*, Bory; caudex rather stout creeping underground clothed with wiry branched fibres, fronds fasciculate, *sterile* ones on short naked dark-brown stipites erect rigid chartaceous glabrous and smooth a span to a

foot long lanceolate acuminate much attenuated at the base pinnatifid almost to the rachis, segments approximate (with a very narrow sinus) from a broad base ovato-oblong subfalcate less than an inch long obtuse the lower ones dwarf forming only very shallow lobes (the segment of a circle) as it were upon the stipes, *fertile* fronds larger and stouter in every respect than the sterile and upon a stout stipes almost a span long, coriaceous pinnate broad-lanceolate acuminated slightly attenuated at the base a foot long (in our specimen), pinnæ numerous but remote sessile the longest of them 2 inches 1½ line wide all of them sessile and in the upper half so decurrent at the inferior and superior base that the frond is there almost pinnatifid whilst the inferior ones though decurrent are free, involucres membranaceous pale brown transversely wrinkled minutely denticulate.—*Bory in Duperrey's Voy. Bot. p.* 273. *Colla, Pl. Chil.* ii. *n.* 139. *Kze. in Linnæa*, ix. *p.* 57. *Gay, Fl. Chil.* vi. *p.* 481. L. decurrens, *Kze. MSS.* (*Kze.*). Blechnum lomarioides, *Mett. Fil. Lechl. p.* 14. *Sturm, En. Fil. Chil. p.* 25.

Hab. Chili; Conception, *D'Urville*, *Gay*; Talcahuano, *Poeppig*, *Pl. Chil. n.* 139; Province of Valdivia, *Philippi*, *Pl. Chil. n.* 214; *De Bière*, *Lechler*, *Pl. Chil. n.* 511. Juan Fernandez, *Gay*.—No figure exists of this plant, and I must confess that until I very recently received an authentic specimen in Lechler's beautiful collections of Chilian plants, I was disposed, from the imperfect and too brief descriptions, to refer it to *L. alpina*, a common species in S. Chili. Now my difficulty is to distinguish it from some states of *L. lanceolata*, never yet considered a Chilian species. Bory, the author of *L. blechnoides*, says very justly, "Les frondes ont cela de remarquable dans les stériles, que les pinnules (*segments*) inférieures sont plus étendues en hauteur qu'en longueur, tandis que le contraire a lieu dans les supérieures." Now this same structure, which no doubt suggested the name *decurrens* to Kunze, exists in a remarkable degree in many specimens of *L. lanceolata*, and in some of its allies. If *L. blechnoides* is deserving of being kept distinct from *L. lanceolata*, I think the characters must be looked for in the fertile frond, which in Lechler's solitary but very fine specimen in my possession, is much larger there and longer (more than twice the height) than the sterile specimens, giving a peculiar character to this rather dwarf plant, analogous to what we see in our *Blechnum boreale* (Lomaria Spicant), and suggesting no doubt the name *blechnoides*. The pinnæ are here two inches long, and wide in proportion, and most of them very decurrent at the base. Still it remains to be seen if those characters are permanent:—the smaller and slenderer fertile fronds of *L. lanceolata* are very constant in my specimens. From *L. alpina*, *L. blechnoides* is abundantly distinct in the different nature of the caudices, in the long slender stipites of the former, the narrower, linear sterile fronds, and close-placed, oblong, short fertile pinnæ.

15. L. *vulcanica*, Bl.; caudex erect or declined sometimes four or five inches or more long thick (one inch in diam.) clothed with the remains of old stipites and towards the extremity especially shaggy with copious dark-brown glossy

subulate hair-like scales, stipites four inches to a span long stramineous slender, the base to the height of one or two inches clothed with the same paleaceous hairs half an inch or more long fasciculate, *sterile* fronds 6-12 inches long ovato-lanceolate acuminate truncate at the base chartaceous rather than coriaceous deeply almost to the rachis pinnatifid inferior pairs distinct so that the lower portion of the sterile frond is pinnate, segments or pinnæ from a broad base oblong-ensiform subfalcate acuminate or obtuse entire or very obsoletely crenato-lobate, the margin thickened, veins rather distant once or twice forked more or less villous or glabrous clubbed at the apex and extending to the margin, inferior pair of pinnules deflexed, superior ones sometimes contracted and fertile, *fertile* fronds about the size of the sterile ones deeply pinnatifid pinnate only below, segments from a dilated base, linear distant, involucres membranaceous marginal toothed and lacerated.—L. vulcanica, *Bl. En. Fil. Jav. p.* 202. *Hook. Ic. Pl.* x. *t.* 969. *Hook. fil. Fl. Nov. Zeal.* ii. *p.* 29. L. deltoides *and* L. deflexa, *Colenso in Tasm. Phil. Journ.* L. villosa, *Fée, Gen. Fil. p.* 68. L. pilosa, *Brack. Fil. U. St. Expl. Exp. p.* 125. *t.* 15.—*β. nana;* caudex very thick and large, fronds 4-5 inches long very rigid and coriaceous. L. muraria, *Colenso, MSS.*

Hab. Java, *Blume;* Mount Gedei, *Thos. Lobb, n.* 266. Fiji Islands, Ovolau, etc., *Milne, Brackenridge.* S. Pacific Islands, *Mr. Bidwill.* Tasmania, in mountain districts, *Ronald Gunn, Esq.* New Zealand, northern island, *Sinclair, Colenso.*—*β.* On rocks, *Colenso.*—A distinct and well-marked species, remarkable for the deflexed lowest pair of pinnæ, and such have also very unequal bases to the pinnæ, the superior base dilated as it were upwards, and the inferior base rounded off. The same characters are found in a dwarf, apparently stunted variety found by Mr. Colenso on dry rocks. The caudex is even stouter and longer than the larger forms, but the fronds are quite small. The Tasmanian and New Zealand specimens are identical with those from Java. The *L. villosa* of M. Fée sufficiently accords with our plant, and his description is made from Mr. Lobb's Java specimens, *n.* 266, which are identical with ours from Java. Mr. Bidwill's specimens, and one of Mr. Milne's, have pinnæ partially sterile and partially fertile on the same frond.

16. L. *aspera,* Kl.; small, caudex stout elongated clothed with wiry roots sarmentose scaly at the apex, sarments frondiform linear attenuated at each extremity lobato-pinnatifid proliferous, fronds cæspitose a span long, *sterile* ones coriaceo-membranaceous lanceolate scarcely acuminate below remarkable attenuated into a very short stipes deeply almost quite to the costa pinnatifid, segments numerous approximate sometimes subimbricated ovato-oblong obtuse rarely apicu-

late inferior ones gradually shorter semiovate above on the dichotomous veins especially towards the margin quite rough with harsh raised points, the margin entire, *fertile* fronds dwarf much shorter than the sterile ones and on a longer stipes in proportion coriaceous rigid pinnated very obtuse scarcely attenuated below, pinnæ oval-oblong very obtuse crowded, involucres broad. (Tab. Nostr. CXLIV.)—*Klotzsch in Linnæa*, xx. *p.* 344. Blechnum asperum, *Sturm, Fil. Chil. p.* 22.

Hab. Chile, *E. B. Philippi.* Chiloe, *Cuming*, n. 2.—Our specimens of this plant collected by Philippi, kindly communicated by Dr. Klotzsch, and those of Mr. Cuming, exhibit a very peculiar mode of increase by what may be called sarmenta (runners). A frond, as it would appear, instead of taking a rather lanceolate form and rising erect, becomes contracted and decumbent, and having attained its full length, takes root at the extremity and sends up new fronds, as we have endeavoured to show in our figure. Similarly changed fronds I have remarked in *L. lanceolata*, yet I have not observed them to be proliferous. Indeed, our plant is too near some of the dwarfer forms of that species. Independent, however, of these frondose runners, if I may so call them, the very short stipites and the remarkable rough upper surface and margins of the frond (like a delicate file), and the dwarf nature of the fertile fronds, will, if permanent characters, afford good distinctions.

17. L. *Spicant*, Desv.; caudex or rhizome stout subterranean copiously rooting scaly towards the extremity, scales mostly lanceolate brown, fronds tufted a foot to two feet and more high, *sterile* ones more or less spreading subcoriaceous lanceolate slightly acuminate attenuated below deeply pectinato-pinnatifid nearly to the rachis, segments horizontal approximate linear or linear-oblong subfalcate obtuse very opaque entire, veins oblique forked extending nearly to the margin, *fertile* fronds much taller upon longer stipites generally with the same outline or circumscription as the sterile ones pinnated, pinnæ 1–2 inches long falcate distant narrow-linear acute almost apiculate, sori when young intramarginal in age appearing to cover the whole under surface, involucre pale-brown membranaceous.—*Desv. in Berl. Mag.* v. *p.* 325. *Presl, Tent. Pterid. p.* 142. *Fée, Gen. Fil. p.* 68. *Pappe and Rawson, Syn. Fil. Afr. Austr. p.* 29. L. borealis, *Lk.* Stegania borealis, *Br.* Spicanta borealis, *Presl, Epim. Bot. p.* 114. Blechnum boreale, *Sw. Syn. Fil. p.* 115. *Sm. Engl. Bot. t.* 1159. *Schkh. Fil. t.* 110. *Schlecht. Adumbr. Fil. Cap. p.* 38. *Hook. & Arn. Brit. Fl. ed.* 7. *p.* 590. *Willd. Sp. Pl.* v. *p.* 408. Blechnum Spicant, *Sm. Mém. Acad. Roy. Tur.* v. *p.* 411. Osmunda Spicant, *Linn. Sp. Pl. p.* 1522. Onoclea Spicant, *Hoffm.* Asplenium Spicant, *Bernh.* Acrostichum Spicant,

Vill. Sibth. Struthiopteris Spicant, *Weiss, Scop.*—*β. Japonica;* barren frond very broad in the middle semipellucid its very short stipes and the base of the fertile stipes densely villous with very long narrow subulate glossy aureo-nitent subulate scales, the rest of the fertile stipes and the rachises and young fertile pinnæ paleaceous with shorter and scattered scales (distinct species ?). Blechnum Spicant, *C. Wright in Herb. of the U. S. Pacific Expl. Exped.*—*γ. elongata;* fronds 2½ feet long, segments acute sometimes obscurely crenated. Lomaria crenata, *Presl, Reliq. Hænk. p.* 51.

Hab. Throughout Europe, it would appear, abundantly, from Norwegian Lapland (*Wahlenberg*) to Spain (*Durieu*) and the Islands of the Mediterranean, Crete, *Heldreich*, and to Madeira and the Azores and Teneriffe (*Webb, Bourgeau*), which appears to be its southern limit in the northern hemisphere. It is found in Middle Russia (*Jundz*), in the Caucasian provinces, *Koch* and *Ruprecht*, Kamtschatka, *Pallas and Ruprecht.*—*β.* Hakodadi, Japan, *C. Wright, in Herb. Nostr.* —*γ.* North-west America, chiefly in the Russian possessions. Island of Sitkha, *Eschscholtz;* Nutka Sound, *Hænke;* Juan de Fuca, *Brackenridge;* Observatory Inlet, *Dr. Scouler;* Port Etches, Prince William's Sound, *Hinds.* Upon the authority of a specimen in Bory de Saint-Vincent's herbarium, said to be gathered by *Mr. Riche* at the Cape of Good Hope, it finds a place among the 'Filices Capenses' of Schlechtendal and of Rawson and Pappe; but the statement has never been confirmed.

Every European botanist is familiar with the Fern now under consideration, for no species is more general in this quarter of the globe; but, eastward, it seems to become rare in Russia, and Lithuania is perhaps its limit in that direction. I do not find it recorded as a Siberian plant, till it makes its appearance in Kamtschatka (stretching south to Japan); and crossing the sea of Kamtschatka, in nearly the same parallel of latitude, it again occurs at the southern extremity of the Russian possessions in N.W. America, and the northern extremity of the British possessions there: nor does it appear to exist in any other spot of that vast continent—nowhere in the United States. Mr. Thomas Moore, in his 'British Ferns, Nature-printed,' has indeed, in his accurate account of this plant, expressed an opinion that a Brazilian species, *Lomaria Sellowiana*, Pr., is perhaps identical with our *Lomaria Spicant*, as also another species found in Chili. The one to which he alludes in Chili, is no doubt the *L. alpina*, of which an excellent figure from the living plant is given at t. 32 of our 'Filices Exoticæ.' I think the two are more distinct than many acknowledged species of this variable genus, and that the different nature of the caudex or rhizome, and the form of the pinnæ of the fertile fronds, will alone clearly distinguish them. Of the *L. Sellowiana*, Pr. (name only, not anywhere described), I possess perfect authentic specimens from Dr. Klotzsch, and they are identical with the Chilian *L. alpina*, a plant of very extensive distribution in the southern hemisphere, more so than *L. Spicant* is in the north, yet it does not extend into the tropics; and "Brazil" in the present case means South Brazil, probably some part of East Patagonia visited by Sellow; and it is abundant all round the coast thence along the Straits of Magellan, to Conception in Chili, as well as elsewhere. The reported discovery of *L. Spicant* at the Cape of Good Hope, by a Mr. Riche, needs to be authenticated. May not the specimen that was seen in M. Bory's herbarium really have belonged to *L. alpina*, which, growing as it does, in the same parallel as the Cape, and east

and west of it, may very likely have been detected on some of the mountains of South Africa?

The numbers of synonyms given under this species will show the various opinions of botanists as to its proper genus. If the very young sori be inspected, the fructification is indicative of *Blechnum*, but the habit and dimorphous fronds are characteristic of *Lomaria*. There is a remarkable variety or monstrosity of this species found in West Derbyshire, near Liverpool, by Mr. Henry Robson, which is proliferous at the end with numerous repeatedly dichotomous branches. Our var. γ. is distinguished by its very tall size, the largest of them measuring more than two feet. Var. β, from Japan, may possibly prove a distinct species. I possess only one specimen. Besides the greater breadth of the sterile frond in the middle, and consequently the longer segments, the entire short stipes of the sterile frond, and the lower portion of the stipes of the fertile frond, quite shaggy with long, narrow subulate, very glossy, almost aureous scales, are characteristic marks.

18. L. *alpina*, Spr.; small, caudex elongated creeping rarely thickening to any extent subfiliform branched scaly at the extremities and at the origin of the stipites, fronds fasciculated stipitate coriaceous oblongo-lanceolate scarcely contracted at the base, *sterile* fronds pinnatifid nearly to the rachis, segments approximate horizontal oval-oblong obtuse entire glabrous, stipes short, *fertile* ones on long naked stipites pinnated, pinnæ rather distant sessile horizontal linear-oblong obtuse subfalcate uppermost ones only subconfluent, involucres inserted a little within the margin serrulate.—*Spreng. Syst. Veget.* iv. *p.* 62. *Hook. fil. Fl. Antarct.* ii. *p.* 393. *t.* 150. *Fl. Nov. Zeal.* ii. *p.* 30. *Brackenr. Fil. Un. St. Explor. Exped. p.* 123. *Hook. Fil. Exot. pl.* 32. Stegania alpina, *Br. Prodr. Fl. Nov. Holl. p.* 152. L. polypodioides, *Gaud. in Frey. Voy. Bot. p.* 374. L. australis, *Kze. Coll. Pl. Pœp. p.* 57. *Gay, Fl. Chil.* vi. *p.* 481. L. microphylla, *Goldm. in N. Act. L. C.* 16. *Suppl.* ii. *p.* 460. L. antarctica, *Carm. in Linn. Soc. Trans.* xii. 512. L. linearis, *Colens. in Tasman. Phil. Journ. p.* 176. Blechnum alpinum, *Metten. Fil. Hort. Bot. Lips. p.* 64. Lomaria Gayana, *Fée, in Fl. Chil.* vi. *p.* 481. *and in Foug. 7me. Mém. p.* 25. *t.* 10. *f.* 1. L. Sellowiana, *Pr. Tent. Pterid.* (*name only*) *fide Klotzsch in Herb. Nostr.* L. Pœppigianum, *Sturm, En. Fil. Chil. p.* 26. L. trichomanoides, *Desv. in Mém. Soc. Linn.* vi. *p.* 287. Acrostichum polypodioides (*polytrichioides* in text), *Du Pet. Th. Fl. Trist. d'Acugna, p.* 32. *t.* 2. Polypodium Pinna-marina, *Poir. in Lam. Cycl.* v. *p.* 520 (*fide Hook. fil.*).

Hab. Temperate and cold regions of the southern hemisphere: apparently first discovered by *Commerson*, in the Straits of Magellan, where it is very abundant, as well as on Hermite Island (*J. D. Hooker*), Cape Horn, and along

the west coast of Patagonia, Valdivia (*Lechler, Pl. Chil. n.* 196), and as far north as Conception, in Chili, *Pœppig*, *Gay* (Cordillera of Colchagua), and Juan Fernandez, Staten Land, *Menzies*; "South Brazil," *Sellow*. Falkland Islands, *J. D. Hooker*. Kerguelen's Land, *M'Cormick*. Tristan d'Acunha, *Carmichael, Milne and M'Gillivray, Voy. of H.M.S. Herald*. Tasmania, *Brown, R. Gunn, Lawrence*. Alps of S. Australia, on Cabbaros, a mountain 6000 feet elev., *F. Mueller*. New Zealand, northern, middle, and southernmost islands, *Banks, Colenso, Sinclair, J. D. Hooker, Lyall, etc. etc.*:—thus it may be said to circumscribe the globe, wherever there is land, between lat. 35° and 55° S.—This interesting little *Lomaria* has even a more extensive geographical range in the southern hemisphere than our well-known *Blechnum boreale* (Lomaria Spicant) has in the northern, and like that, too, it is doubtful whether it should be referred to *Lomaria* or to *Blechnum*. The involucre certainly has its origin a little within the margin, and such is the case with some species of *Pteris*, *Cheilanthes*, and *Pellæa*. Fée's *L. Gayana* is this plant with rather narrower segments to the fertile fronds; and we have the authority of Sellow's specimens from Dr. Klotzsch, named (but nowhere described) by Willdenow *L. Sellowiana*, being also identical.

19. L. *Banksii*, Hook. fil.; small, caudex often an inch or an inch and a half thick 2–6 inches and more long clothed with the densely-matted wiry roots mixed with remains of stipites, at the apex among the new fronds paleaceous with rather copious lanceolate castaneous scales, fronds tufted a span and more long (include the rather short stipites) linear-lanceolate tapering much downwards, *sterile* ones coriaceo-membranaceous opaque glabrous pinnatifid almost to the rachis with elliptical obtuse entire horizontal segments the lower gradually abbreviated so as to form a decurrent deeply sinuated wing to the rachis, stipes short more or less scaly, *fertile* pinnæ smaller than the sterile ones (but the stipites longer) linear-oblong pinnated, pinnæ small oblong obtuse sessile sometimes a little decurrent.—*Hook. fil. Fl. N. Zeal.* ii. *p.* 31. *t.* 76 (*excellent*). Osmunda obtusa, *Banks and Soland. MSS.*

Hab. New Zealand, throughout the islands, *Banks and Solander*, *Menzies* (Dusky Bay); Bay of Islands, *All. Cunningham*, *J. D. Hooker*. Auckland, *Sinclair*; East Coast, *Colenso*; Middle and South Islands, *Lyall*.—A peculiar and, we think, a well-marked species, admirably represented in the 'Flora of New Zealand' above quoted. The sterile fronds taper remarkably downwards, the segments becoming smaller and smaller and gradually decurrent upon the short stipes, sometimes almost occupying the whole stipes.

20. L. *pumila*, Raoul; the smallest of the genus, caudex when young at least subrepent slender at length much and compactly entangled forming a dense caudex-like mass in conjunction with the descending wiry roots, bearing a few broad-ovate hyaline fulvous scales only at the very apex, stipites tufted an inch long filiform chaffy at the very base with a few scales resembling those of the caudex, fronds

3–5 inches long membranaceous subpellucid glabrous lanceolate rather obtuse tapering below, *sterile* ones pinnatifid nearly to the costa, segments ovate or oblongo-ovate 1½ to 2½ lines long obtuse entire or subcrenate, *fertile* pinnæ on longer stipites pinnated, pinnæ about 2 lines long oblong obtuse with a mucro the base more or less decurrent.—*Raoul, Choix de Pl. Nouv.-Zél. p.* 9. *t.* 2 *A.* (*not of Kaulfuss, which is* Blechnum australe). *Hook. fil. Fl. N. Zeal.* ii. *p.* 28.

Hab. New Zealand, Akaroa, Middle Island, *Raoul.*—Dr. Hooker was led, from the form and general nature of the fronds, to compare this with some of the smallest and most delicate forms of *L. lanceolata*, and even to confound it with that state, and hence spoke of it as "not uncommon in damp woods, watercourses of the Northern and Middle Islands of New Zealand." He had overlooked the peculiar scales at the base of the stipes and at the extremity of the slender creeping but entangled caudex, so different from those of *L. lanceolata* and its affinities, where the scales are copious, long, and subulate. I have seen no specimens but those of M. Raoul, obligingly communicated by him. His figure in the 'Choix des Plantes de la Nouvelle-Zélande' is excellent, as are all the botanical drawings of M. Riocreux.

21. L. *doodioides*, Brack.; "stipes subtrigonous short purplish smooth, *sterile* fronds rigid lanceolate attenuate pinnato-partite, pinnæ crowded oblong-lanceolate falcate obtuse reflexed and crenato-dentate at the margin, *fertile* fronds lanceolate pinnate caudato-acuminate attenuate at the base, pinnæ remote elongato-linear acute, indusium membranaceous." *Brack. Fil. U.S. Expl. Exp. p.* 124.

Hab. Sandal-wood Bay, Fiji Islands, *Brackenridge.*—"The size and outline of the sterile fronds resemble very much those of *Doodia aspera*, Br." *Brack.*

22. L. *arguta*, Fée; "sterile fronds lanceolate glabrous the segments deeply dentate teeth curved; fertile fronds longer supported on a long petiole having the aspect of the stem of a *Scirpus* and enclosing several vascular fascicles (3?) becoming free by the desiccation of the cellular tissue which this petiole encloses in the living state, fertile segments linear flexuose." *Fée, 8me. Mém. des Foug. p.* 70.

Hab. Mexico; Valley of Orizaba, Cerro del Agua, 2700 mètres of alt., *W. Schaffner*, *n.* 98 (1854).—"A une analogue lointaine avec la *L. Spicant*, Desv."

23. L. *pectinata*, Liebm.; "frond thin-coriaceous glabrous one-coloured a foot high, frond 7–9 inches long 2–2½ inches broad (stipes 5 inches) lanceolate acute pinnatisect pinnate towards the base (laciniæ 30–40 on each side) diminishing in size upwards, laciniæ alternate towards the base generally

subopposite linear-lanceolate 1–1½ inch long 2 lines wide acute superior base dilated, margin especially from the middle to the apex sharply serrated, horizontal, lowest one divaricated a little shorter and more remote, costules and veins furcate parallel prominent on both sides, stipes and rachis channelled in front acute at the back, fertile frond unknown." *Liebm. Fil. Mex. p.* 81.

Hab. Mountains of Oaxaca; elev. 8–9000 feet.—*Liebm.*

(§ PLAGIOGYRIA,* Kze.—*Capsules with an oblique, entire ring; base of the stipes with spongy glands, and base of the pinnæ beneath sometimes furnished with a gland.*—*Sp.* 24 *to* 28.)

24. L. (Plagiogyria) *biserrata*, Mert. et Lind. in Herb. Kze.; caudex indistinct, stipites fasciculate compresso-triquetrous stramineous somewhat winged below and at the base incrassated subcarnose brown (when dry) studded with several orbicular spongy glands, fronds 1–2 feet long, *sterile* ones chartaceous broad-lanceolate deeply nearly to the rachis pinnatifid below pinnate, segments close broad-linear or sublanceolate horizontally patent subacuminate, lower ones or pinnæ quite sessile all unequally serrated yellowish-green, veins simple or forked rather prominent especially beneath, *fertile* fronds on longer stipites than the sterile pinnated or pinnatifid only at the apex, pinnæ linear scarcely acuminated, sori covering the whole under side between the costa and the insertion of the involucre, which is very conspicuous membranaceous brown transversely waved eventually spreading.—Plagiogyria biserrata, *Metten. Farngatt.* ii. *Plagiog. p.* 7 *and* 8. t. 15. "L.? serrata, *Moritz, Herb.*"

Hab. Columbia, Tovar, *Moritz, n.* 400. Merida, *Linden, n.* 556, and *Fendler, n.* 335 (*Herb. Nostr.*). Ocaña, *Schlim, n.* 312 (*Herb. Nostr.*). Pasto, Peru, *M'Lean.*—Of the section *Plagiogyria* among *Lomaria*, this is the only one found in the New World, all the others are of Eastern origin.

25. L. (Plagiogyria) *adnata*, Bl.; caudex stout short, stipites cæspitose elongated brown triquetrous a span to 1½ foot long slender naked at the base dilated and subcarnose furnished with orbicular spongy glands, fronds a foot and more long ovato-lanceolate chartaceo-membranaceous, *sterile*

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* See our remarks on this group at p. 2 of the present volume.—Mr. Moore, in his most useful "Index Filicum," adopts the genus in his "Table of genera" among "addenda," and rests its character mainly on the "*linear sori laterally confluent*," and placing it next to *Platyloma*, J. Sm. (Pellæa, *Lk.*, and this work), where it has no natural affinity whatever.

ones pinnatifid almost to the rachis below pinnated but all the pinnæ united by a narrow wing, segments mostly opposite distant lanceolate much acuminated more or less falcate, the inferior base round, superior base extended upwards the margins entire or obscurely toothed the apex strongly serrated, *fertile* fronds pinnated, pinnæ alternate distant linear sessile rather obtuse, sori covering the whole under side between the costa and the brown membranaceous very distinct involucre. (Tab. CXLVII.)—*Bl. En. Fil. Jav. p.* 205. L. Griffithiana, *Hook. Herb.* Plagiogyria scandens, *Metten. in Plagiog. p.* 9?

Hab. Java, *Blume*. Khasia, *Griffith*, and, at elevations of from 1000 to 4000 feet, *Hooker fil. and Thomson*.—At first sight the lower half of the frond appears to be pinnated, but it will easily be seen that the pinnæ or segments are united by a narrow wing on the rachis. All the segments are more or less falcate and remote, and their superior base runs up, as it were (*surnum currens*, in contradistinction to the term *decurrens*), so as to join the rounded base of the one above it. The base of the stipes has very much the character of that of *Plagiogyria biserrata*, but it is narrower and less carnose than in that species, which is, however, its nearest ally, as being pinnatifid; but the remote segments, broad sinuses, scarcely serrated margins (except the acuminated apex), will abundantly distinguish it. The stipites are very long and slender, and the old ones angularly brittle externally, for there is a stout stupose thread, which remains entire when the outer separates in tubes. I here find the capsules indistinctly helicogyrate. Mettenius's *Plagiogyria scandens*, a plant of Griffith, and from Khasia, appears to have been described from very imperfect specimens, and I suspect is this plant: if so, it has no indication of being a scandent plant. Indeed, Mettenius does not seem to have known the caudex, for he says, "Truncus . . . ?"—Mr. Moore suggested to me that this plant is the *L. adnata* of Blume, as far as can be judged from his short character, and I adopt it rather than increase the number of synonyms heedlessly.

**** Sterile fronds pinnated throughout, or with the pinnæ confluent only at the very apex. Sp.* 26 *to* 28.

(§ Plagiogyria *continued*.)

26. L. (Plagiogyria) *euphlebia*, Kze.; caudex stout woody a foot high (*Wall.*), fronds cæspitose on long stipites incrassated triquetrous and carnose and bearing spongy glands at the base, fronds pinnate throughout 1–2 feet long subchartaceous olive-brown when dry, *sterile* ones broadly ovate-lanceolate, pinnæ erecto-patent 5–6 inches long remote uniform the ultimate quite free larger than the rest, all sessile or the lower ones shortly but distinctly petioled elongato-lanceolate quite cuneate at the base the margin bluntly and rather obscurely serrated the acuminated apex strongly serrated the base beneath destitute of glands, veins rather distant mostly once forked, *fertile* fronds narrower and more oblong, pinnæ linear or broad-linear elongated obtuse, cap-

sules clothing the whole under side between the costa and the brown membranaceous involucre.—*Kze. in Bot. Zeit.* vi. 521. *Schkh. Fil. Suppl. p.* 61. *t.* 125. Acrostichum triquetrum, *Wall. Cat. n.* 23 (*in part*). Plagiogyria triquetra, *Metten. Plagiog. p.* 10. Plagiogyria euphlebia, *Mett. l. c. p.* 10. Olfersia triquetra, *Tent. Pterid. p.* 234. Stenochlæna triquetra, *J. Sm. in Hook. Journ. Bot.* iv. *p.* 149. *Presl, Epimel. Bot. p.* 165.

Hab. Nepal, *Wallich*. Assam, *Griffith*. Khasia, temperate region, alt. 6000 feet. Japan, *Goring, n.* 128 (*Mettenius*).—This fine species, though only recently described and figured by Kunze as a Japan plant, has been long known in British, and, perhaps, represented by less perfect specimens, in Continental herbaria, as the *Acrostichum triquetrum* of Dr. Wallich; and I must do Dr. Wallich the justice to say that in his MS. volumes of Indian Ferns in my possession, he has accurately described what I consider the most remarkable feature of the Plagiogyria section of *Lomaria*:—"Stipites fragiles, 12–18-pollicares, *basi crassi* carnosi triquetri, *angulis membranaceo-marginatis acutissimis, latere interiore latiore plano, reliquis convexis.*" He failed to observe the peculiar glands, and he has united into one species what I am here disposed to consider as two, and which have been so described by others. But it is to the present plant that Dr. Wallich's name of *Acrostichum triquetrum* is attached in my herbarium. Appropriate as the name is, seeing it has never been accompanied by any description or character till after the publication of Kunze's *Lomaria euphlebia*, I do not hesitate to adopt that latter name. There can, I think, be no question of the identity of Kunze's plant and ours. It is by no means a solitary instance of a Fern of the mountain districts of eastern Bengal being common to Japan.

27. L. (Plagiogyria) *pycnophylla*, Kze.; caudex stout erect very woody and having many wiry roots, fronds fascicled, stipites subquadrangular 2-furrowed in front (as is the rachis) at the base dilated fleshy triquetrous subalate bearing spongy glands, fronds 1–2 and more feet long, *sterile* ones subchartaceous opaque brown when dry, oblong-ovate pinnated for its whole length except that the small terminal ones are confluent into a lobed (or pinnatifid) and finely acuminate and serrated apex, pinnæ horizontally patent sessile or very nearly so numerous approximate narrow oblong-lanceolate very finely almost caudately acuminate, the base very obtuse and truncate (neither dilated nor contracted) at the base beneath furnished with one or two prominent glands (sometimes wanting), the margin very minutely serrulate, the caudate apex strongly serrated, veins numerous closely placed simple and forked, *fertile* fronds narrower pinnated, pinnæ linear obtuse on very short petioles with a gland on the under side, sori as in the other *Plagiogyriæ*, involucre at first vaulted conspicuous membranaceous brown at length forced back by the capsules. (Tab. CXLVIII.)—*Kze. in Bot.*

Zeit. vi. *p.* 143. Acrostichum triquetrum, *Wall. Cat. n.* 23. *in part.* Stenochlæna? pycnophylla, *Pr. Epim. Bot. p.* 165. Lomaria scandens, "*De Vriese in Herb. Kze.*" L. callosa, *Fée, Gen. Fil. p.* 70. Plagiogyria adenopus, *T. Moore, MS.*

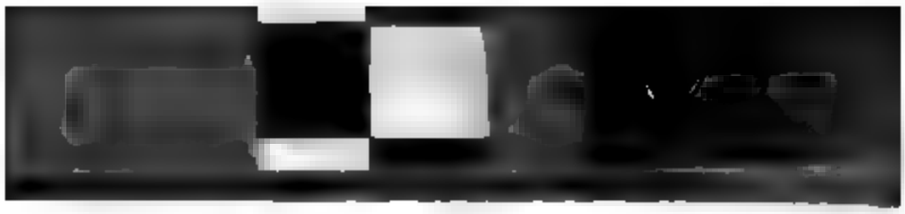
Hab. Nepal, *Dr. Wallich.* Assam, Khasia, Bootan, *Griffith, Booth.* Sikkim, 7–10,000 feet, *Hook. fil. and Thomson.* Java (*De Vriese*), *Thos. Lobb, n.* 274, (*in Herb. Nostr.*).—This species is mixed with Dr. Wallich's *Acrostichum triquetrum* in his distributed plants, and in his MS. description he says:—"Pinna terminalis proximis pluries longior, gracilis, sessilis v. petiolata" (*L. euphlebia*, Kze.), "*nunc* lobato-pinnatifida" (*L. pycnophylla*, Kze.). When he observes, too, of the pinnæ, "subtus parallele et copiosissime venulosæ," he had our present plant in view, of which it is characteristic, as is also the very spreading pinnæ, their truncated base, and, above all, the almost constant presence of one, rarely two, prominent, oblong, obtuse glands on the under side, at the setting-on of the pinnæ. Kunze's and Mettenius's descriptions of *L. pycnophylla* leave no doubt of its identity with our Himalayan and Java specimens.

28. L. (Plagiogyria) *glauca*, Bl.; caudex . . . ?, stipites elongated subcompressed tetragonous with two furrows in front, the base dilated triquetrous on the anterior face bearing spongy depressed glands, fronds ovato-oblong 1–2 feet long pinnated, *sterile* pinnæ numerous 3–5 inches long chartaceous horizontally spreading sessile or very nearly so lanceolate acuminated the base truncated beneath having a gland as much attached to the rachis as to the very short petiole, the margins finely dentato-serrulate rather more strongly at the apex white and almost powdery beneath green above with a tinge of red, veins copious compact simple and forked, ultimate short pinnæ confluent into a pinnatifid and lobed caudate apex, *fertile* pinnæ narrow-linear obtuse erecto-patent on very short petioles which sometimes bear a gland beneath, sori and involucres as in other *Plagiogyriæ.—Bl. En. Fil. p.* 204. *Kze. in Bot. Zeit.* viii. *p.* 143; *in Schkh. Fil. Suppl.* ii. *p.* 24. *t.* 138 (*excellent*). Plagiogyria glauca, *Metten. Plagiog. p.* 9.

Hab. Java, *Blume, Zollinger, n.* 231 and 335 (Kze.). Khasia Hills, alt. 6000 feet, *Hook. fil. and Thomson.*—The quite white, and in the more perfect specimens powdery substance of the under side of this beautiful *Lomaria*, gives it an unmistakable character; but in other respects it has the closest affinity with *L. pycnophylla.* It is not so conspicuously glanduligerous at the base and under side of the sterile pinnules, and they seem generally obsolete on the fertile pinnæ, or more depressed. The sterile pinnæ are less finely acuminated, but the other marks, I fear, are not quite to be depended upon, and there is the same degree of confluence of the uppermost pinnæ, which so well distinguishes that species from its near ally, *L. euphlebia.* Though first found in Java, *L. glauca* is not confined to that island, but is met with, apparently not abundantly, in Khasia.

29. L. *procera*, Spr.; caudex stout woody elongated clothed

at the extremity as well as the base of the stipes with large ovate or lanceolate acuminate ferruginous opaque chaffy scales, fronds tufted ample from a span to 4 feet high including the stipes, when young densely clothed with the imbricating more or less deciduous scales just described, oblong-ovate pinnated, pinnæ very numerous on the larger specimens generally horizontally patent, *sterile* ones (often partially fertile) more or less coriaceous usually brown when dry oblong or oblong-lanceolate 3 inches to a span long often an inch wide subfalcate sessile or slightly petiolate truncate or cordate at the base and there often unequal, one side forming a more or less rounded lobe obtuse or acute or acuminate, at the apex the margins finely dentato-serrate rarely entire, terminal pinna free often very long, veins close compact very patent simple or forked near their base, *fertile* pinnæ linear more or less broad from 2–6 inches long distant and spreading or crowded and erecto-patent sessile, lower ones often petiolate obtuse or terminated with a caudate point, sori with very crowded capsules, involucres marginal or subintramarginal large at first convolute and fornicate at length spread very much broken into deep lobes.—*Spreng. Syst. Veget.* iv. *p.* 65. *A. Cunn. Bot. N. Zeal. in Comp. Bot. Mag.* ii. *p.* 263 (*excl. Syn. Rich.*). *Hook. Ic. Pl. t.* 127, 128. *Hook. fil. Fl. Antarct.* i. *p.* 110; *Fl. New Zeal.* ii. *p.* 27. *t.* 75. *Var.* minor, *Brack. Fil. U. S. Expl. Voy. p.* 127. *Hombr. and Jacq. Voy. Pôle Sud, Crypt. t.* 2 *E.?* (*sine descr.*, scales at the base of the stipes narrower and longer). L. latifolia, *Colenso, in Tasm. Journ. Nat. Sc.* ii. *p.* 176. L. Capensis, *Willd. Sp. Pl.* v. *p.* 291. *Rawson and Pappe, En. Fil. Cap. p.* 27. Blechnum Capense, *Schlecht. Adumbr. Fil. p.* 34. *t.* 18. Onoclea Capensis, *Sw. Syn. Fil. p.* 111. Osmunda, *L. Mant.* Stegania procera (*and* S. minor), *Br. Prodr. p.* 153. L. Chilensis, *Klfs. En. Fil. p.* 154. *Hook. Gen. Fil. t.* 64 *B, sterile and fertile pinnæ, and analysis. Gay, Fl. Chil.* vi. *p.* 480. Blechnum Chil., *Metten. Fil. Lechl. p.* 11. *Sturm. En. Fil. Chil. p.* 23. L. spectabilis?, *Liebm. Fil. Mex. p.* 83. *Rich. Fl. Nov. Zel. t.* 247 (fertile frond only). L. lineata, *Willd. l. c. p.* 290 (*venation more distinct*). Osmunda *and* Onoclea, *Sw.* L. striata, *Willd. l. c. p.* 291. Blechnum procerum, *Lab. Fl. Nov. Holl.* ii. *p.* 87. *t.* 247. Parablechnum procerum, *Presl, Epim. Bot. p.* 109. Onoclea procera, *Spreng. in Schrad. Journ.* iii. *p.* 267. Osmunda procera, *Forst. Prodr. n.* 414. Asplenium procerum, *Bernh. Act. Erf.* 1802, *p.* 4.



f. 1. **Lomaria Gilliesii**, *Hook. and Grev. Ic. Fil. t.* 207. Orthogramme Gilliesii, *Pr. Epim. p.* 121.

[Dr. Hooker has distinguished four varieties of this plant. These and some others I think it more convenient to notice under the respective localities, and some further synonyms will here also be given.]

Hab. A Fern chiefly confined to the southern hemisphere, extending, however, in the New World, north to Mexico and the Caribbean islands, and south to antarctic islands; in the warmer regions apparently confined to the mountain districts.

New Zealand, where it was first detected by *Forster* and since found by all visitors, and as far south as Banks's Island (*Dr. Lyall*). That group of islands affords the following forms:—1. Pinnæ narrow and finely acuminated, waved at the margin (the form given in Hook. Ic. Plant. t. 127, 128, *A. Cunningham*).—2. Barren frond, having the stipes twice dichotomous, each branch bearing pinnæ of the ordinary form, *J. D. H.*—3. Frond with one side of the rachis having all sterile pinnæ, and the other together with the terminal one fertile, *J. D. H.*—4. Var. *minor* (Stegania minor, *Br.*), a small and apparently young form, a span or more high, with the uppermost pinnæ more or less adnate. (*S. exigua*, Col.)—5. A very handsome variety, two feet and more long, with copious imbricated long pinnæ, much and finely acuminated, with cordate and biauricled bases overlapping each other with great regularity: of the sterile frond a few pinnæ only, near the middle, have their upper half contracted and fertile; the lower half of the frond is suddenly contracted, and the pinnæ, representing large bracteas, are opposite, deeply cordate, an inch long and an inch wide. The fertile frond has the upper half with ordinary soriferous pinnæ; the middle ones similar but with large sterile auricles; at their base are the same broad cordate pinnæ of the sterile form, *Rev. W. Colenso* (*L. imbricata*, Col. MS.).—6. A specimen, n. 261 (*Colenso*), with the scales at the base of the stipes longer and narrower and more rigid than usual. Fertile pinnæ with auricles at the base are not uncommon.

Tasmania, extremely abundant, *La Billardière, Brown, All. Cunningham, R. Gunn, Archer, J. D. Hooker, etc.* Mr. Gunn sends fine specimens, of which one side or half is composed of sterile, the other of fertile pinnæ: one has perfectly oblong and quite obtuse sterile pinnæ at both ends. The var. *minor* is frequent. Some specimens have the fully-formed fronds paleaceous on the stipes, rachis, and costæ.

Lord Auckland's and Campbell's Islands, plentiful near watercourses, *Hombron, J. D. Hooker.*

Australia; here it seems to be very local. Port Jackson, *Brown, Mr. Cloves.* Blue Mountains, and shady and wet rocks, and Macquarrie Harbour and Argyle County, *Allan Cunningham.* Near Melbourne, *F. Adamson*, 1854: all present the ordinary forms.

Cape of Good Hope (*L. Capensis*, Auct.), *Thunberg, Bergius, Mundt and Maire, Carmichael, Drége, Krauss* (Table Mountain and Constantia), *Harvey and others.* I do not find it extends beyond the extreme south of Africa, and it is very uniform in its general appearance. Drége's var. *luxurians* (Fil. Cap.) has many of the sterile and fertile pinnæ twice or more dichotomously forked at the apices. Stipes varies from stramineous to deep-chestnut.

Malay Islands. Java, *Thos Lobb* (common form, in Hb. Nostr.); lofty mountains of Java (*L. vestita*, Bl. En. Fil. Jav. p. 203), and summit of Mount Tjerimai, Province of Cheribon, and summit of the volcanic mountain Ternates (L. pyrophila?, *Bl. En. Fil. Jav. p.* 204). Luzon, *Cuming*, n. 141: rachises and costæ beneath densely glossy, paleaceous (*L. vestita*, J. Sm., *and, no doubt*, Bl.): it does not appear in any of our collections from India proper.

Pacific Islands. Society Islands, mountain forests of Tahiti, *Brackenridge*. Loyalty Islands, *Sir George Grey*. Volcanic mountain, Tanna, New Hebrides and mountain of Ngau, Fiji group. Raoul, or Sunday Island, one of the Kermadec group, *Milne*, *M'Gillivray*: sterile pinnæ, in some specimens, more than a foot long, very falcate, fertile, eight inches long, both finely acuminated.

West Indies (*L. lineata* and *L. striata*, Auct.). Jamaica, Blue Mountain Peak, *M'Fadyen*, *Dr. Alexander*. Mount Souffrière, St. Vincent, *Rev. L. Guilding*: sterile pinnæ very large and coriaceous, falcate, an inch and a half broad at the base, nearly entire at the margin, fertile pinnules long-cuspidate at the point; other pinnæ are all sterile on one side, the opposite ones with the broad cordate bases only sterile. Dominica, Coulabian Mountains, *Dr. Imray*, *n.* 83: often one side of the rachis sterile, the other fertile. Guadaloupe, *L'Herminier* (can this be *L. robusta*, Fée, Gen. Fil. p. 69? from the same country and gathered by the same person): fertile pinnæ on one side partially fertile and contracted, while the upper half is broad and sterile, giving an elongated spathulate form to the pinnæ.

American Continent. Mexico appears to be its northern limit. Totutla, in thick forests, elev. 3500 to 4500 feet. Cordillera of Vera Cruz; ordinary form, some leaves a foot long, *Martens and Galeotti*, *n.* 6406; *Linden*, *n.* 66 (L. longifolia, *Schlecht. and Mart. and Galeotti*, *Fil. Mex. p.* 49); temperate region of Mexico, *Liebmann*; L. danæacea, *Kze. in Linnæa*, xviii. *p.* 326; *Lieb. Fil. Mex. p.* 82, *and Herb. Nostr. n.* 125 (from Liebmann). Our specimen is only a common *young* form of the sterile plant, with more perfect fertile pinnæ apart; also *L. ensiformis?* and *L. falciformis*, Liebm. l.c., may be referred here. From the same locality and same elevation, in some respects exactly resembling the *L. longifolia*, Schlect., we have specimens exhibiting some remarkable differences: the *lower* sterile pinnæ of a very large specimen are petiolate, and have a large black glossy gland attached to their point of insertion on the rachis (not noticed by the discoverer); another specimen has nearly all the pinnæ fertile in their lower half, the others contracted and fertile only in the middle; this is *L. spectabilis*, Liebmann in Herb. Nostr., and in Fil. Mex. p. 83, where the author quotes "*Blechnum* (Lomaria) *sp. an nova?*, Schlecht. Linnæa, v. p. 613; *Lomaria Schiediana*, Presl, Pteridogr. p. 143, name only, and *Lomaria longifolia*, Mart. et Gal." Guatemala, *Mr. Skinner*; sterile pinnæ and partially fertile intermixed.—Columbia, *Moritz*, *n.* 300, ordinary form. *L. arborescens*, Kl. and Karsten, in Herb. Nostr. and in Linnæa, xx. p. 347. West Coast, Moro, and Bay of Choco, *Seemann*; Caracas, *Birschel*, *Linden*, *n.* 123 *and* 245. Merida, *Moritz*, *n.* 298; rachis and costæ beneath clothed with pale scales (*L. longifolia* and *stenophylla*, Kl. in Herb. Nostr.); and Bogota, *Holton* (same var.). Paramos of San Pedro, elev. 10–11,000; Ocaña, *Schlim*, *n.* 307. Venezuela, Sierra Nevada, *Funck and Schlim*, *n.* 1008, and *Hartweg*, common form; Tovar, *Fendler*, *n.* 118, 119, 121, *and* 122, varying in size, and remarkable for drying of a bright pale-green colour, perhaps from skill in drying.—Peru, *Pœppig*. *L. ornifolia*, Pr. Reliq. Hænk. i. p. 51, and Kze. in Linnæa, ix. p. 59, and in Herb. Nostr.; Quebrada of Bilcacota, *Mathews*, *n.* 980 *and* 1797, and *Hartweg*, *n.* 1483.—Brazil (*L. Brasiliensis*, Rad. Fil. Bras. p. 50. t. 72 and 72 bis, and *L. striata*, Rad. Syn. Fil. Bras. n. 88), *Gardner*; Organ Mountains, 5934, 5935, and *n.* 143; fertile pinnæ mostly apiculate. South Brazil, *Gardner*, *n.* 5305; Rio Grande do Sul, *Mr. Fox*, *Sellow*. "*L. Chilensis*, Kaulf.," Klotzsch in Herb. Nostr. Mendoza, *Dr. Gillies* (*L. Gilliesii*, Hook. et Grev. Ic. Fil. t. 207; *Blechnum*, Mett.; *Orthogramme*, Pr.).—Chili (*L. Chilensis*, Kaulf. et Auct. *Blechnum*, Mett., from Juan Fernandez to the extreme south, *Bertero*, *Cuming*, *n.* 802, *Cruickshanks* (sterile pinnæ falcate and much waved at the margin), *Capt. Ph. King*, *Pœppig*, *Gay*, *Lechler*, *Pl. Chil. n.* 210 *and* 510, *etc.*

After a careful inspection of almost innumerable samples from the various localities indicated, and many of them authentic ones, I have ventured to consider the many supposed species of authors identical with Forster's original

Osmunda procera of New Zealand. Indeed, with all its variations (and some of them are remarkable enough, but rather of a kind to come under the term of a sport, or freak, of Nature, than to be considered as organically distinct), I scarcely know one species of the genus *Lomaria* which runs so little into doubtful forms as this, provided the student has good specimens under investigation; and there cannot be a question but that the extended geographical distribution of this plant is the cause of so many supposed species being derived from it. Botanists have found it difficult to believe that a new Fern, first detected in a newly discovered country, as New Zealand then was, with its many peculiarities of vegetation, should be afterwards discovered in our and other remote European colonies of the West Indies, the Cape of Good Hope, Chili, etc. etc., and I have myself fallen into this error in the adoption of my *L. Gilliesii* of Mendoza, though I did not fail to notice its close affinity with *L. procera*, which at that time I only possessed from New Holland. Yet this species has not only been retained by competent judges, but has been made the ground of a new genus (*Orthogramme*, Pr.) Of some of the older recorded names, and which still continue as species in the lists of the most correct Pteridologists, *L. linnata* (W. Indian) and *L. Chilensis* and *L. Capensis*, Dr Hooker (Fl. N. Zeal. l. c.) has already declared he could not distinguish from true *procera*. I think indeed that our figure of *L. Chilensis*, given in the Gen. Filicum, will satisfy any one that there is nothing different in that plant from *L. procera*; and if Labillardière's excellent figure (l. c.) of *L. procera*, and Schlechtendahl's equally faithful one of *L. Capensis*, be compared, no difference, even as a marked variety, can be perceived. Distinctions which some botanists are disposed to rely upon, viz. the approximation of the sori to the costa or the margin, are not only variable, but are much affected by the age of the fertile frond. Of *L. Capensis* the accurate Mettenius says, "Sori medii inter costam et marginem, vel ad marginem approximati;" and even that portion of the pinna which is extra-sorous and very evident in a young state, is much obliterated in age, so that, on looking at the back of the pinna, when the involucre is forced back by the capsules, three longitudinal slightly elevated lines will be perceived, the centre one occasioned by the presence of the costa, the lateral ones by the nearly obliterated margin of the frond, reduced to a mere elevated stria.

The only *Lomaria* which I have here referred to *L. procera*, of the correctness of which I entertain any reasonable doubt, is the *L. spectabilis*, Lasm. (*L. longifolia*, Schlecht. in Mart. and Gal. Fil. Mex., and Fée, not Kaulf.), of which I have authentic specimens under both names. It is from Mexico and Guatemala, and is described by Liebmann, but he omits to notice a very peculiar character. On some, but not all, of his and other specimens, the lower pinnæ, particularly of the sterile fronds, are rather long-petioled; and where this petiole joins the rachis, is a remarkable, rather large and distinct, black, glossy *gland*, exactly resembling, except in colour, a very convex scale insect, such as is found to be so troublesome in our Fern-houses. Were it more constant, accompanied as it is with long and rather narrow obsoletely dentate sterile pinnæ, sometimes quite entire (though Liebmann says, "argute serratæ"), I should almost have been disposed to consider this a distinct species. But this gland has been alluded to by Schlechtendahl (and, as far as I know, by no one else), on the West Indian *L. striata*, Willd. (L. procera, *Nobis*), under his *Birchnum* (Lomaria) *Capense*. "Huic (*L. Capensi*) proxima species est *Lomaria striata*, W., quam venis supra impressis, subtus prominentibus, callosoque protuberantia ad basin internam cujusve pinnæ statim dignoscitur." I may observe that a somewhat analogous gland exists on *Lomaria* (Plagiogyria) *pycnophylla*, our n. 27, where, though not invariably present, it is much more constant than in Liebmann's *L. spectabilis*.

28. L. *Magellanica*, Desv.; caudex erect stout almost arboreous 1–2 feet high terminated with a dense mass of very long falcate dark-brown narrow-linear subulate scales with a

still darker-coloured costa and from which springs a crown of fronds including the stipes 1–4 feet high of a very firm coriaceous texture, stipes (clothed at the base with the long falcate scales of the caudex) very stout quite as thick as a goose-quill 4–6 inches to a foot long bluntly 4-sided uneven on the surface furrowed on the upper side and having two rows of tubercles or abortive pinnæ, *sterile* fronds 1½–2 feet and more long oval-oblong acuminate erect rigid pinnated with numerous generally close-placed firm rigid pinnæ, the terminal ones only sometimes confluent at the base linear-oblong obtuse or more rarely acuminate entire, dark-green above rusty-brown beneath, the base sessile truncate sometimes unequally cordate more rarely with a sharp distinct auricle on the lower base, veins close compact simple or forked internal and indistinct, *fertile* frond oblong obtuse, pinnæ very closely placed rather broad-linear generally sessile and more or less adnate obtuse or shortly acuminate, involucre dark-brown slightly marginal, capsules eventually covering the whole surface beneath, rachis clothed with crisped deciduous ferruginous scales or naked.—*Desv. in Mag. Nat. Berl.* 1811, *p.* 330, *in Mém. Soc. Linn. par.* vi. *p.* 289. *Hook. Fl. Ant.* ii. *p.* 393. *Brack. Fil. U. S. Expl. Exped. p.* 126. *Gay, Fl. Chil.* vi. *p.* 480. *Bory, in Mém. Soc. Linn. par.* iv. *p.* 597. L. setigera, *Gaud. in Ann. Sc. Nat.* v. *p.* 98, *and in Freyc. Voy. Bot. p.* 130. L. robusta, *Carm. in Trans. Linn. Soc. Lond.* xii. *p.* 512 (*an Fée?*). L. zamioides, *Gardn. MSS. in Herb. Hook.* Blechnum Magellanicum, *Metten. Fil. Lechl. p.* 14. *Sturm, En. Fil. Chil. p.* 26. L. Boryana, *Willd. Sp. Pl.* v. *p.* 292. *Pappe and Rawson, En. Fil. Cap. p.* 27. Onoclea Boryana, *Sw. Syn. Fil. p.* 111. *t.* 32. Blechnum (*Lomaria*) Boryanum, *Schlecht. Adumbr. Fil. Cap. p.* 35. *t.* 19 (*sterile fronds only*). "Lomaria coriacea, *Schrad. in Gœtl. Gel. Anz.* 1818, *p.* 916 (*not Kze.*)." L. cinnamomea, *Kaulf. Enum. Fil. p.* 153 (*fide Schlecht.*). L. Ryani, *Kaulf. En. Fil. p.* 155. *Kze. Anal. Pterid. t.* 12. L. rufa, *Spr. Syst. Veg.* iv. *p.* 63. L. cycadifolia, "*Colla, Pl. Rar. Chil. p.* 43. *t.* 71." Blechnum cycadifolium, *Sturm, En. Fil. Chil. p.* 23. Pteris palmæformis, *Thouars, Fl. Trist. d'Acugna.* Lomaria lanuginosa, *Kze. Analect. Pterid. p.* 19 (*to which Sturm refers* L. Schottii, *Colla, l. c. p.* 44. *t.* 72). Ceterach, *Pernetty, Voy.* ii. *p.* 56.

Hab. Straits of Magellan and Tierra del Fuego and Falkland Islands, very abundant, *Commerson, Freycinet, Pernetty, C. Darwin, J. D. Hooker* (Hermite

Island, Cape Horn), *Capt. Ph. King* (one of the specimens has very crowded pinnæ, having at the inferior base a large, oblong, acute auricle which laps over the base of the one below it in a very peculiar and regular manner, at an oblique angle from the rachis), *Bougainville, Brackenridge, Capt. Collinson.*—South Chili, frequent, Chiloe, *Capt. Ph. King.*—Juan Fernandez, *Bertero*, n. 1547 (in Herb. Nostr.; rachis and pinnules woolly, with lax, deciduous, paleaceous scales. This is the *L. lanuginosa* of Kze., and *Blechnum cycadifolium* of Sturm, l. c., and Bertero remarks on his specimen "*Lom. Magellanica*, an diversa? Caudex 3-pedalis, in sylvaticis montium, 1830").—Tristan d'Acunha, *Petit-Thouars, Capt. Carmichael* (*L. robusta*, Carm.; rachises very chaffy, with membranaceous deciduous scales), *M'Gillivray and Milne, in Denham's Voyage of the Herald*: young specimens very paleaceous, older ones quite naked.—Brazil: common near Tijucca; moist bushy places near San Pedro, *Gardner*, n. 4396. Boggy places, near the summit of the Organ Mountains; "a Tree-fern, 4 feet high" (in the caudex), *L. zamioides*, Gardn. MS. n. 5936.—S. Brazil (*L. obtusifolia*, Pr. Tent. Pterid. p. 143, fide Klotzsch in Herb. Nostr.): Uruguay, *Mr. Fox*; Rio Grande do Sul, *Tweedie*, with caudex 2 feet high.—British Guiana, *Robert and Richard Schomburgk*, n. 1162 (*L. Schomburgkii*, Kl. in Linnæa, xxii. p. 346).—New Granada, Prov. Ocaña, elev. (?) 8–10,000 feet, *Schlim*, n. 394 (*L. aurata*, Fée, 8me Mém. Nouv. Foug. p. 71).—Merida, *Moritz*, n. 301 (*L. Moritziana*, Kl. in Linn. xx. p. 327).—Venezuela, *Fendler*, n. 340; sterile pinnæ paler beneath than usual.—Peru, *Mathews*, n. 1795; sterile pinnæ ⅔ of an inch broad, very rich, almost golden-tawny beneath.—W. Indies: Montserrat, *Ryan* (*L. Ryani*, Kaulf., and *L. rufa*, Spr.).—South Africa (*L. Capensis* and *L. cinnamomea*, Auct.): Table and other mountains, *Bergius, Drège, Ecklon and Zeyher, Dr. Alexander, and most travellers; Milne, in Denham's Voy. of H.M.S. Herald* (one specimen has the greater part of the fertile pinnæ soriferous only in the upper half, and narrowly acuminate, giving a broadly subulate form to the pinnæ). Macalisberg, *Dr. Sanderson.* (This form exactly corresponds with the figure of *L. Ryani*, Kaulf. in Kunze, Anal. Pterid. t. 12, which he compares with *L. rufa*, Spr., and *L. lanuginosa*, both states of *L. Magellanica*).—Bourbon, *Bory*; Mauritius, *Bojer, Bouton* (my specimens from both those countries have in the sterile fronds pinnules continued nearly to the base of the stipes, but gradually becoming smaller [½ an inch long], and spathulate).—Madagascar, *Dr. Lyall, Bojer* (*L. coarctata*, Boj. MS. in Herb. Nostr.; an interesting suite of specimens, from the infant state with almost a simple frond, but breaking below into small orbicular pinnules. Sterile fronds with pinnæ narrow, and some of them fertile in their upper half).

This is a species of less extended geographical distribution than its ally *L. procera*, much more constant to its normal character, that is, much less liable to sport, yet a goodly number of species have been formed of it. The scales at the summit of the caudex are most remarkable, and alone suffice to distinguish it, and, fortunately, they extend some little way up the stipes, and thus are often preserved on Herbarium specimens. They are more like bristles than scales, very slender, narrow-subulate, an inch to an inch and a half long, dense and strongly falcate, quite different from the soft and broad pale ferruginous deciduous paleæ which invest the rachis and pinnæ in a young state. The entire, generally blunt sterile pinnæ, also their thick coriaceous character, the different colour of the two sides, and the disposition to become tawny, or of a cinnamon or almost golden colour beneath, are important characteristics. In general the base of the frond is contracted, and the pinnæ are not only sessile, but frequently adnate, and the margins seem to be always free from real serratures.

29. L. *Dalgairnsiæ*, Pappe and Rawa.; "fronds pinnate membranaceous, sterile pinnæ alternate remote sessile lanceolate-oblong narrowed at both ends pale beneath glabrous,

terminal ones confluent at their bases, fertile pinnæ linear straight erect sharp-pointed, involucres involvent laceratociliate, stipes and rachises clothed with woolly ferruginous scales." *Pappe and Raws. Syn. Fil. Afr. Austral. p.* 27.

Hab. Dense forests of the Knysna, *Miss Dalgairns*, 1856.—"This appears to be the Fern collected by Drége in the Du Toit's Kloof, and noticed by Kunze (Linnæa, x. p. 506) as a variety of *L. Boryana* (*L. Magellanica*). It does not however answer satisfactorily to the short diagnosis, and seems to be distinct."

30. L. *cycadoides*, Pappe and Raws.; fronds pinnate coriaceous, pinnæ attenuate remote erect sessile glabrous auricled at the base, *sterile* ones lanceolate oblong blunt very veiny revolute glossy entire dotted at the margin, *fertile* pinnæ linear-lanceolate recurved at the apex, rachises and angular stipes smooth, caudex scaly comose.—*Pappe and Raws. Syn. Fil. Afr. Austral. p.* 28 (*not* Lomaria cycadifolia, *Colla*).

Hab. "Woods of Natal, *Plant*, n. 335.—A sterile specimen of the same Fern, from Madagascar, is preserved in Dr. Pappe's collection."—May not this be a form of *L. Magellanica*, which see, and which is also found in Madagascar?

31. L. *linariæfolia*, Pr.; "fronds elliptico-lanceolate pinnate, pinnæ of the sterile fronds sessile alternate lanceolate acuminate entire coriaceous cuneate at the superior base cordate at the inferior, pinnæ of the fertile fronds elongate cuspidate sessile, rachis and costæ paleaceous beneath." *Pr. Reliq. Hænk. p.* 52.

Hab. Peru.—"Appears to be closely allied to *L. lineata*, Willd., and differs only in the entire pinnæ."

32. L. *spissa*, Fée; "fronds ovate rigid pinnate pinnatifid towards the apex reddish when dry, stipes depressed scarcely channelled above somewhat winged beneath, bundles of vessels eight, six inferior disposed in a circle, two inferior distant elongated straight, *sterile* pinnæ thick opaque lanceolate rather acute patulous rounded at the base, inferior and intermediate ones adnate, veins approximate, costa and rachis scaly, *fertile* pinnæ linear obtuse with a callous mucro, indusium very broad at the maturity of the capsules bullate, receptacle thick connivent with the costa, sporangia large ovate mixed with narrow-lanceolate scales, annulus with 20–22 articulations, spores ovate thick smooth." *Fée, Gen. Fil. p.* 71.—"L. Boryana, *Kze.* (*non Willd.*)."

Hab. Cape of Good Hope, *Drége*.—The author compares it with *L. Boryana*, Willd., in which however "there are no scales, the spores are much larger and

tuberculose, the annulus has only 16 articulations, the pinnæ are obtuse and quite free at the base." It may probably be safely referred to *L. Magellanica*.

33. L. *cuspidata*, Kze.; caudex "repent and as well as the base of the stipites scaly", frond (including the stout stipes) 3 feet and more long erect rigid firm coriaceous pinnated, *sterile* with the pinnæ remote spreading 5–6 inches long exactly lanceolate tapering at the base and there sessile and adnate but not decurrent the apex finely acuminate everywhere entire opaque, veins internal indistinct except on the under side where they appear as dark close-placed patent lines not in the least prominent, terminal pinnæ large and in our solitary specimen with a lobe (a confluent inferior pinna) on one side at the base, *fertile* frond rather shorter than the sterile, pinnæ 7–8 inches long nearly opposite sessile narrow-linear acuminate falcate 3-nerved at the back, involucre very conspicuous brown membranaceous entire, stipes and rachis stout firm very straight terete furrowed on the anterior side, the back dark purple-black minutely punctated, the base moderately paleaceous. (TAB. CLI.)—*Kze. in Linnæa*, ix. *p.* 59.

Hab. Pampayaco, Peru, parasitic on *Cyathæaceæ*, *Pœppig*, 1829. On Mount Campana, near Tarapota, Eastern Peru, *R. Spruce*, 1856.—This very distinct species of *Lomaria*, only hitherto described from Pœppig's Peruvian specimens, has been recently found by Mr. Spruce during his remarkable journey of ten years' duration across the great continent of South America, by way of the Amazon and its tributaries, to the Pacific Ocean. The sterile pinnæ have almost exactly the form and texture of the common Oleander; but what is remarkable, all of them are not only sessile, but adnate with the rachis; the lower ones with a breadth of a quarter of an inch, the upper ones of ½ an inch, yet the bases are not decurrent. The stipes and rachis are singularly stout, erect, terete, and rigid, almost stramineous on the anterior side, the opposite side blackish-purple, and as far as this colour extends (and no further), the surface is seen, under a lens, to be covered with very minute raised points, too minute to render them sensible to the touch.

34. L. *punctulata*, Kze.; caudex thick subrepent, at the extremity paleaceous with dense falcato-lanceolato-subulate glossy scales, fronds 1½–2 and 3 feet long lanceolate but broadest upwards much contracted below pinnate, *sterile* ones membranaceo-coriaceous, pinnæ approximate very numerous subimbricated sessile from a broad and subhastate base oblongo-lanceolate gradually acuminated horizontally patent subfalcate quite entire obscurely punctate at the margin confluent at the apex, lower ones gradually smaller and tuberculiform more distant extending almost to the base of the compressed sulcate stramineous stipes, the veins oblique

once or twice forked, *sterile* fronds longer than the fertile, the pinnæ sessile exactly linear apiculate sometimes quite hastate at the base, involucre brown membranaceous broad plane (not fornicate) continuous or interrupted its margin very entire, rachis stramineous furrowed in front sparingly paleaceous.—*Kze. in Linn.* x. *p.* 27. *Pappe and Raws. En. Fil. Cap. p.* 28. Blechnum punctulatum, *Sw. Syn. Fil. p.* 313. *Willd. Sp. Pl.* v. *p.* 409. *Schlecht. Adumbr. Fil. Cap. p.* 37. *t.* 21 *and t.* 22. *f.* 2. *Metten. Fil. Hort. Lips. p.* 64. Lomaria densa, *Kaulf. En. Fil. p.* 151. *Sieber, Fil. Exsic. n.* 7. L. auriculata, *Desv. in Mém. Soc. Linn. par.* vi. *p.* 290. *Bl. En. Fil. Jav. p.* 201. Blechnum tricuspe, *Kaulf. in Sieb. Fil. Exsic. n.* 5. Mesothema punctulatum, *Pr. Epim. Pl. p.* 113. Blechnum rigidum, *Eckl. Herb. Cap. Un. It. n.* 130 β (*vix Sw.?*).—*Abnormal form.* Scolopendrium Krebsii, *Kze. Fil. a Gueinz. coll. in Linnæa,* xviii. *p.* 118. *Fil. Schkh. Suppl. p.* 176. *t.* 74. *Fée, Gen. Fil. p.* 209, *cum obs. p.* 211. *J. Sm. Cat. Cult. Ferns, p.* 49. *Cat. Ferns, Kew, p.* 6. *Metten. Fil. Hort. Lips. p.* 57. *t.* 5. *f.* 7. *Pappe and Rawson, Syn. Fil. Afr. Austr. p.* 24. Onychium Krebsii, *Kze. in Linnæa,* i. *p.* 29; x. *p.* 504. Blechnum Atherstoni? *Pappe and Rawson, Syn. Fil. Afr. Austr. p.* 16.

Hab. South Africa, from the Cape Colony to Natal, frequent, *Rawson and Pappe, Harvey, etc.* Lofty mountains of Java, *Blume.*—*Abnormal form* (Scolopendrium Krebsii, *Kze.*). Natal, *Gueinzius.* Graham's Town, apparently plentiful, *Atherstone.*—We follow Kunze in placing this in *Lomaria* rather than in *Blechnum*, for it has more of the habit of the former than the latter, yet standing on the borders of the two. It has been by some confounded with *Blechnum rigidum*, Sw.,—to us a very dubious plant. The present is a well-marked species, the broad, truncated, sessile bases of the pinnæ of the sterile fronds being cordate, or even hastate or subsagittate, the inferior lobe overlapping the one below, the superior one underlapping the one above, so that they are seen to imbricate each other whether one looks at the upper or under side of the frond, and in the fertile fronds the hastate lobes of the pinnæ so much resemble the intermediate lobe (or main portion of the pinna), that that form has received the name of *Blechnum tricuspe.* Under Desvaux's name of *L. auriculata*, Blume gives, as a locality for this plant, "in montibus altissimis Javæ," but this locality perhaps requires confirmation.—It may create surprise to find a *Scolopendrium* of the accurate Kunze, and adopted by other able botanists as such, unhesitatingly referred to a well-known *Lomaria* (or *Blechnum*); but I have specimens from Mr. Atherstone in my herbarium, clearly showing the passage from *Lomaria punctulata*, Sw., to *Scolopendrium Krebsii*, Kze. I have just alluded to the fact that the former has nearly as strong a claim to be considered a *Blechnum* as a *Lomaria.* The fronds are more or less dimorphous, and even when least so, the fertile pinnæ are so contracted, and the sori so nearly cover the inferior pagina, from the margin to the costa, that most botanists, I think, who have preserved the two genera, refer this species to *Lomaria*, and in this state the involucres are the most regular and perfect. I possess fertile fronds, however, where the pinnæ are unusually broad at the base, the rest of the

pinna being contracted: then the sori within the broader portion are irregularly waved and partially broken up into short pieces, which have a tendency to an oblique direction (not parallel with the costa). Where the whole of the fertile pinna takes a manifestly broader form throughout (broad-linear acuminate), I find the sorus broken up into *Woodwardia*- or *Doodia*-like involucres, more or less oblique with regard to the costa, still preserving an imperfect contiguity. But, when the fertile pinnæ are at the broadest (and I possess some half an inch in diameter), the sori are completely separated into very oblique, almost transverse, double sori, distant from the costa, sometimes halfway between it and the margin; and, if one of the more transparent specimens of these be held up between the eye and the light, and examined with a pocket-lens, it will be seen that the costal areoles, formed by the *transverse* receptacular veins of *Lomaria*, are singularly elongated, together with the receptacular vein itself, carrying its portion of the sorus with it, taking nearly the shape of an inverted letter V (Λ). The broken portion of the sorus or involucre is, if I may so say, carried along with it, and thus is formed an abnormal, double involucre, the two opening face to face and resembling those of a *Scolopendrium*. The careful Mettenius, indeed, has represented, and I have no doubt accurately, the venation of this kind in his Hort. Fil. Lips., l. c., but the receptacular veins are made to appear to separate into two, and this may possibly occur also, but the thinnest of the fronds of this Fern are very opaque, and the exact nature of the receptacular veins, thus transformed, is not easily detected.

It is singular that although Kunze was aware of the affinity of his *Scolopendrium Krebsii* with *Lomaria punctulata*, and though he actually represents at f. C., t. 74, of his Suppl. to Schkuhr's Ferns, a state of his *Scolopendrium* with the perfect sori of *Lomaria* or *Blechnum* (and the *sterile* fronds of the two are identical), and though he says of *S. Krebsii*, "Der Farnn zeigt den Habitus einer *Lomaria*, z. B. meiner *L. punctulata*, und die Fiedern der jüngsten Wedel sind kurz und breit," yet did not detect their specific conformity; nor did M. Fée, although he dwells on the "transmutations" of the fructification of *Scol. Krebsii*. He does so, however, in reference to the figures of Kunze, not apparently from his own observations on the plant.

35. L. *Germainii*, Hook.; rhizome rather than caudex subterranean perpendicular rooting and bearing the remains of old stipites branched at the summit and paleaceous with brown scales, stipites tufted on these heads or branches ¼ an inch to an inch and a quarter long stramineous slightly paleaceous dark-brown at the base, fronds from 1 to 3 inches long pinnate, *sterile* ones spreading firm coriaceous subpatent oblong-lanceolate obtuse, pinnæ oblong or oblong-ovate close-placed and even imbricated (except the small inferior one) 3–4 lines long horizontal very obtuse sessile slightly decurrent at the base entire or obscurely sinuato-crenate some of the superior ones with the upper margin 3–4-lobed the edge thickened and somewhat cartilaginous, veins sunk obscure, *fertile* fronds one to each tuft of sterile ones (in the specimens before me) on a stipes twice or more the length of the sterile, oblong obtuse brown, pinnæ oblong crowded thick curved upwards the sides much reflexed, involucres brown quite marginal in age slightly

torn at the edge. (TAB. CLII.)—Lomaria? *sp. sterilis, Kze. in Linnæa*, ix. *p.* 58?

Hab. Chili, Campaña de Quillota, *Th. Germain*. Plantes du Chili (*exsicc.*). Summit of "Pico Pilque," Antuco, Chili?, *Pœppig?* Mountains, Nelson, New Zealand?, *Bidwill*.—One specimen of this well-marked species, and the smallest of the genus, has been long in my herbarium, ticketed as from Nelson, New Zealand, gathered by the late Mr. Bidwill; whether so marked by mistake I will not say, but the only other specimen I have seen, and undoubtedly the same as to species, is from Chili, collected by M. Germain, and is certainly undescribed by any author, except, as I strongly suspect, it is the "*Lomaria?* in a sterile state," noticed by Professor Kunze in the 9th volume of 'Linnæa,' p. 58, n. 137. All his characters sufficiently accord, except that he says the fronds are pinnatifid, whereas ours is clearly a pinnated Fern. He speaks of the "imbricated segments," a circumstance not likely to take place in a pinnatifid frond, and his concluding observation quite corresponds with our plant, "Haud dubie nova Filicum species; præcedenti (*L. alpinæ*) similis, sed diversa videtur pinnis" (laciniis?) "latioribus basi angustioribus." The fronds, for so small a Fern, are singularly thick and coriaceous. The rhizome is exactly as described by Kunze (and not at all creeping): "Ex rhizomate crasso perpendiculari radiculoso gemma paleacea sæpius biceps exsurgit, frondibus rosulatis curvatis s. deflexis, 3-4-pollicaribus."

36. L. *filiformis*, A. Cunn.; caudex very long scandent stout paleaceous, fronds scattered distant, *sterile* ones 1–2 feet long lanceolate acuminate pinnated, pinnæ 2–3 inches long rather distant submembranaceous petiolate oblong-lanceolate acuminate truncate rarely cordate 2-lobed at the base serrated, petiole obscurely articulated on the rachis, lowest pinnæ more remote dwarf oval or orbicular supreme ones subconfluent (there are besides smaller *abnormal* linear-oblong nearly sessile *fronds* with pinnæ scarcely ½ an inch long oval or orbicular more sharply serrated), *fertile* fronds shorter than the sterile ones broad ovate, pinnæ petiolate elongated 4–5 inches long linear-filiform, involucre very evident at first involute at length reflexed deep chestnut-brown with very minute crystalline points on the surface, stipes short (3–4 inches) and rachis slightly and deciduously paleaceous. (TAB. CXLIX.)—*All. Cunn. Pl. of N. Zeal. in Hook. Comp. to Bot. Mag.* v. ii. *p.* 363. L. propinqua, *All. Cunn. l. c. p.* 364. L. pimpinellæfolia, *Hook. fil. in Hook. Lond. Journ. of Bot.* iii. *p.* 412. Stenochlæna heteromorpha, *J. Sm. in Hook. Bot. Journ.* iv. *p.* 149. *Hook. fil. Fl. N. Zeal.* ii. *p.* 46. *Brack. fil. U.S. Expl. Exp. p.* 77. Osmunda reptans, *Banks in Sol. MSS.*—An Stenochlæna Feejeensis, *Brack. Fil. in U.S. Expl. Exped.* 78. *t.* 11?

Hab. Northern and Middle Islands of New Zealand, as far south as Banks's Peninsula, *Sir Jos. Banks, All. Cunningham, Fraser, Sinclair, Colenso, Dr. Logan, J. D. Hooker, Dr. Lyall, Brackenridge, and others*. Sandalwood Bay, Fiji Islands?, *Brackenridge*.—Mr. Brackenridge observes that the creeping rootstock of this

(which is at first slender, but increases in thickness towards the point, and is often branched) "ascends the trunks of trees to a height of 20 or 30 feet, clinging to the bark by means of its wiry pilose rootlets, and producing, from the ground upwards, numerous small sterile fronds 3–5 in number." The species is a most distinct one, and one of its chief characteristics is the presence of a second and abnormal kind of frond, apparently occupying the lower portion of the caudex, nearly sessile, with small petiolated pinnæ, almost exactly resembling the leaves of our well-known *Pimpinella Saxifraga*. But we possess series of specimens of which many are seen gradually to pass into the normal form. These pimpinelloid fronds do not appear to have struck Mr. Brackenridge, but the species of *Stenochlæna* which follows next after this plant in the 'Filices of the U.S. Expl. Expedition,' p. 7. t. 11. f. 1, from the Fiji (*S. Fejeensis*, Brack.), so exactly resembles the fronds in question (and it was only found in a sterile condition), that the two appear to me to be identical. It is otherwise, as far as we know, a species peculiar to New Zealand.

The involucre, or indusium, is so evident on the fertile pinnæ, quite different in colour and texture, and the habit is so entirely that of a *Lomaria*, that I do not see upon what ground this plant can be referred to J. Smith's *Stenochlæna*.

37. L. *fluviatilis*, Spr.; caudex often elongated (3–4 inches) formed of the united bases of the old stipites and of wiry roots, very chaffy above with long dense subulate brown scales, fronds tufted a span to 2 feet long including the short stipites, generally very erect strict linear submembranaceous 1–2 inches broad pinnated, *sterile* ones with the pinnæ elliptical very obtuse sessile more or less adnate but not decurrent denticulate, terminal ones coadunate, lower ones remote smaller and often orbicular, stipes short clothed with spreading chaffy scales, *fertile* fronds narrow-linear, pinnæ erect sessile shortly petiolate linear obtuse scarcely an inch long, all the rachises paleaceous with spreading subulate scales.—*Spr. Syst. Veget.* iv. *p.* 65. *Hook. fil. Fl. N. Zeal.* ii. *p.* 28. Stegania fluviatilis, *Br. Prodr. Fl. Nov. Holl. p.* 152. L. rotundifolia, *Raoul, Choix de Plantes, Nouv. Zél. p.* 9. *t.* 2 *B. Colens. in Tasm. Journ. Nat. Sc.* ii. *p.* 170. (*not Bl., nor Desv.*).

Hab. Tasmania, *Brown*, *R. Gunn* (Acheron River, etc.), *Laurence*. S. Australia; Delatiti and Upper Mitta-Mitta, *F. Mueller*. New Zealand, *Forster in Herb. Hook*. Mountainous parts of the Northern Island, and Middle and Southern Islands, *Colenso*, *Joliffe*, *Raoul* (Akaroa); Banks's Peninsula, *Lyall*.—A very peculiar species. Pinnæ numerous both in the sterile and fertile fronds. Raoul's figure admirably represents his own specimens, which, however, seems almost a passage to the *L. membranacea*, next to be noticed, but it has the copious scales on the stipes and rachises of the present species.

38. L. *membranacea*, Col.; small, a hard knot is formed by the aggregation of the bases of the tufted stipites and the tufted wiry roots which can scarcely be called a caudex, it is scaly at the summit (and at the bases of the stipites) with rather few subulate dark-coloured scales, fronds scarcely a span long erect subflexuose tender membranaceous green linear-lan-

ceolate pinnate, *sterile* fronds with the pinnæ oval-oblong broadly adnate but not decurrent very obtuse strongly dentato-serrate lower ones suborbicular lowest rather remote abbreviated terminal ones confluent, stipes scarcely an inch long filiform, *fertile* fronds usually longer than the sterile ones linear pinnated, pinnæ rather remote linear sessile but not decurrent short 2 lines to ½ an inch apiculated lowest ones remote very minute, stipes 2–4 inches long filiform. (Tab. CXLV.)—L. membranacea, *Colens. MSS.*

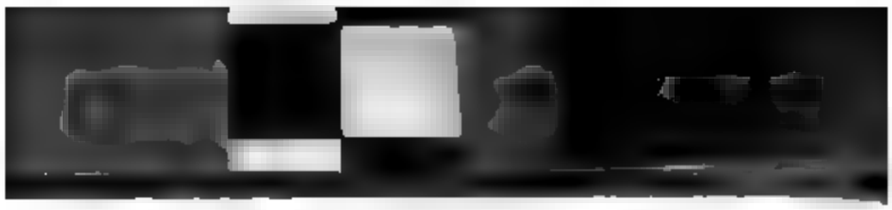
Hab. Bay of Islands, New Zealand, *Colenso, J. D. Hooker;* Waiheki Island, near Auckland, *Joliffe.*—The nearest affinity of this is assuredly with *L. fluviatilis*, Br., from which it differs in its much smaller size, subflexuose fronds, in the entire absence of the chaffy subulate scales so abundant in that species, and its very different habit. It is barely possible that this may be a *Lomaria fluviatilis* growing in a very dry place, and thence, or from some other cause, reduced in size, altered in form, and deprived of the chaffy scales on the stipes and rachises which are so remarkable in that species.

39. L. *nigra*, Col.; caudex indistinct formed of the bases of old stipites and wiry roots paleaceous with a few lanceolate scales, fronds rather long-stipitate a span long (including the stipes) oblong glabrous or downy, *sterile* fronds membranaceous black-green broadest at the base very obtuse lyrato-pinnate, pinnæ sessile oval or subrotund (large for the size of the frond) eroso-sinuate ultimate segment the largest lobed lowest pair large one or two pairs above it generally smaller than the rest, stipes slender about half as long as the frond scaly as is more or less the rachis, *fertile* pinnæ longer than the sterile pinnated with few linear acute pinnæ of which the ultimate one is much elongated 2–4 inches, fertile stipes twice as long as the sterile one more or less scaly.—*Colens. in Tasm. Phil. Journ.* v. *p.* 176. *Hook. Ic. Plant. t.* 960. *Hook. fil. Fl. N. Zeal.* ii. *p.* 31.

Hab. New Zealand, Northern Island, east coast and the interior, *Colenso, Sinclair;* Milford and Bligh's Sound, *Lyall.*—This small species will rank near *L. fluviatilis*, from which it seems very distinct in the short broad fronds of a very dark, blackish-green colour, and truly lyrato-pinnate. The lowest pair of pinnæ is generally large, giving a truncated character to the base of the frond; above that are one or two pairs of smaller pinnæ: the terminal segment or lobe is invariably the largest. The fertile frond has a few long (in proportion to the size of the frond) and narrow pinnæ, and the terminal pinna is twice or thrice as long as the rest. Some of the fronds are downy with copious short hairs. The chaffy scales on the stipes and rachis are fewer and less patent than in *L. fluviatilis.*

(*All the following, apparently of this section, are unknown to me.*)

40. L. *Regnelliana*, Kze.; "frond coriaceous glabrous paler



beneath oblong-lanceolate pinnate, *sterile* ones short-stipitate, pinnæ sessile approximate subimbricate erecto-patent from a subcordate or cuneate base oblong obtuse apiculate margined, margin slender recurved waved punctate above the base of the pinna repand towards the apex unequally serrated closely and obsoletely veined, costa a little prominent beneath furrowed above evanescent at the apex, *fertile* frond long-stipitate, pinnæ linear-oblong flexuose acute apiculate at the sterile apex, sori prominent, indusium distant from the margin brown at length torn, stipes of both fronds brown the base and creeping caudex fusco-paleaceous." *Kze. in Linnæa*, xxii. *p.* 576.

Hab. Brazil, Minas Geraes, *Regnell.* Rio das Contas, *Martius.*—"A species with almost the habit of *Blechnum serrulatum*, and having an affinity with *Lomaria obtusifolia*, Pr. Tent. Pterid. p. 148,"—but which I can find nowhere described.

41. L.? *speciosa*, Bl.; "fronds pinnate coriaceous soriferous at the extremity, pinnæ alternate petiolate, *sterile* ones ovate or oval-oblong acuminate rather acute at the base entire, veins parallel reticulated (!), *fertile* linear elongate, stipes glabrous, caudex scandent." *Bl. En. Fil. Jav. p.* 202.

Hab. Primeval woods of Java, *Blume.*—"*Lomaria fraxinea*, Willd., differs from this in having the pinnæ much smaller and cordate at the base." Willdenow assimilates his *L. fraxinea* to *Acrostichum sorbifolium*, an American plant (*Lomariopsis sorbifolia*, Fée), but it is evident that Blume's plant, with its anastomosing venation, is something quite distinct.

42. L. *rotundifolia*, Bl. (not Colenso); "*sterile* frond undivided 3-lobed or pinnate, pinnules subsessile coriaceous glabrous serrulate the margin revolute, lateral ones subrotund, terminal oblongo-lanceolate acuminate obliquely cuneate at the base." *Bl. En. Fil. Jav. p.* 204.

Hab. "Lofty mountains of Java."

43. L. *gracilis*, Bl.; "caudex scandent aculeate, *sterile* frond pinnate purplish, pinnæ lanceolate acuminate erose, *fertile* ones decompound, segments narrow-linear subbifid." *Bl.*

Hab. On trees in the mountains of Java, *Bl.*

44. L. *unguiculata*, Fée; "fronds rigid pinnate, stipes canaliculato-striated above partially reddish (parce rufo) squamose bearing 8 fascicles of vessels, 2 superior ones smaller, 2 intermediate ones larger, four inferior minute, *sterile* pinnæ approximate subimbricated lanceolate shortly

petiolate rather obtuse at the apex with a callous point green above reddish beneath, veins slender parallel, *fertile* pinnæ longer linear petiolate waved long-unguiculate at the apex beneath having 3 narrow furrows, sporangia reddish, receptacle thick linear nerveless, indusium broad, annulus with 20–22 articulations, spores smooth obliquely ovoid." *Fée, Gen. Fil. p.* 71.

Hab. Madagascar, *Pervillié.*—"Filix magna, rigida, rufescens, multifrondulata (many pinnæ); ungue longo curvato frondulas fertiles terminante."

45. L.? *lucida*, Pr.; "sterile fronds lanceolate pinnate, pinnæ alternate petiolate acuminate serrated, superior base truncate subauriculate inferior rotundato-crenate pale-glaucous beneath." *Pr. Reliq. Hænk. p.* 52.

Hab. Luzon.—A sterile frond is all that was known to the author of this species.

46. L. *inflexa*, Kze.; "frond lanceolate coriaceous glabrous pinnated less divided at the apex, *sterile* frond acuminate, pinnules adnate alternate approximate divergent from a subcordate obsoletely auricled base falcato-oblong attenuated and rather obtuse at the apex closely furcately veined paler beneath, *fertile* frond stipitate lanceolate obtuse, pinnæ shortly petiolate patenti-erect linear-oblong obtuse mucronulate curvately inflexed, the costa prominent beneath purplish above, rachis purplish on both sides paleaceous especially at the base, stipes short black-purple densely clothed at the base with lanceolato-subulate brown scales." *Kze. in Linnæa*, xviii. *p.* 117; *in Schkuhr, Fil. Suppl.* i. *p.* 150. *t.* 65; *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 28.

Hab. Natal, *Gueinzius* (*Kze.*).—This, judging from the figure and the pinnated, not pinnatifid, sterile frond, might rank near *L. punctulata*, but the fertile frond seems very different, more truly lomarioid, and with short and comparatively broad pinnæ.

47. L. *angustifolia*, H.B.K.; "fertile fronds pinnate, pinnæ sessile linear narrowed at the base, middle nerve naked, indusium entire." *H.B.K. Gen. et Sp. Am.* i. *p.* 18.

Hab. Quito, *Humboldt and Bonpland.*

48. L. *acuminata*, Pr.; "sterile fronds lanceolate pinnate, pinnæ alternate sessile ovato-oblong much acuminated serrulated rounded at the base, veins simple parallel." *Pr. Reliq. Hænk. p.* 52 (*not Desv.*).

Hab. Luzon. "Frondem fructificantem non vidi," *Pr.*

49. L. *Loxensis*, H.B.K.; "fertile fronds pinnate, pinnæ linear obtuse cordate at the base subsessile glabrous, middle nerve rachis and stipes thickly clothed with white scales, indusium fimbriato-lacerate." *H.B.K. Nov. Gen. Am.* i. *p.* 18.

Hab. Peruvian Andes, between Gonzanama and Loxa, alt. 1060 hexap., *Humboldt and Bonpland.*

50. L. *mucronulata*, Fée; "fronds glabrous pinnate, stipites glabrous yellowish thickness of a crow's-quill sulcate above bearing two small ovate bundles, rhizome creeping scaly clothed with red lanceolate much acuminated scales, *sterile* pinnæ glabrous sessile, middle ones approximate and subimbricate cordate at the base falcate lanceolate toothed at the margin rough mucronulate, inferior ones distant hastate, *fertile* pinnæ narrower alike in form, lower ones sterile, all mucronulate, sporothecia submarginal neither extending to the base nor the margin, indusium thin, receptacle linear very narrow without a nerve (enervato), sporangia ovoid, annulus with 18 articulations, spores ovoid." *Fée, Gen. Fil. p.* 72.

Hab. East Indies, *Olivier.*—"Filix glabra; facie *Lomariæ Spicant;* stipitibus gracilibus."—Notwithstanding that this is said to have the habit of *L. Spicant*, it is placed in a different section by M. Fée, viz. "§ *Paralomaria*," distinguished by the "sporangia e margine remotiuscula:" whereas he places *L. Spicant* in his "§ *Eulomaria*" "sporotheciis marginalibus."

51. L. *Olivieriana*, Fée; "fronds pinnate, *sterile* ones ovato-lanceolate, stipites scaly spotted with red, pinnæ 20-jugate lanceolate sessile acuminate cordate the margin serrated serratures obtuse, veins parallelo-furcate prominent imbricate (?) lying at an angle of 45° with the rachis, terminal pinna like the rest, *fertile* fronds robust taller, pinnæ petiolate longer linear proliferous even to the apex subcordate at the base, indusium broad multipartite at the maturity of the capsules, receptacle nerved thick, capsules large ovate, annulus 26–28-articulate, spores thick ovate oblique." *Fée, Gen. Fil. p.* 70.

Hab. East Indies, *Olivier.*—"Filix magna robusta rigida, rachi maculato profunde sulcato."

52. L. *marginata*, Fée; "fronds pinnate, rachis squamose furrowed, *sterile* ones ovate in circumscription, pinnæ lanceolate obtuse shortly petiolate cordate alternate pale-green, costa channelled scaly, veins parallel turgid at the apex not extending to the pellucid margin, *fertile* ones robust, pinnæ very long flexuose attenuate cordate at the dilated base some linear and altogether proliferous, others lanceolate dilatate

fertile near the costa, receptacle thick-nerved (*nervato*), indusia at the maturity of the capsules lacerated, sporangia very large ovate, annulus very thick with 18–20 joints, spores ovoid thick." *Fée, Gen. Fil. p.* 71.

Hab. Island of Bourbon, *Montbrison*.—" Filix erecta, magna, ovata, robusta," *Fée.*

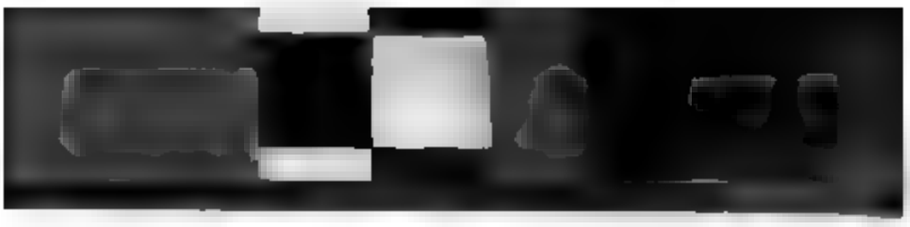
53. L. *acrodonta*, Fée; " sterile fronds oval, petiole smooth fulvescent clothed at the base with large lanceolate scales, rachis depressed deeply furrowed, frondules lanceolate acuminate toothed only at the summit rounded at the base and rather long-petioled spreading cartilaginous with close veins and a scaly costa, *sterile* fronds with a very robust and furrowed rachis, frondules very long straight erect, pinnules sharp twisted (*contournées*) at the summit clothed with scales of which one-half (in the dried state) are plaited." *Fée, 8me. Mém. des Foug. p.* 70.

Hab. Mexico, at Huatusco and Totutla, *W. Schaffner*, *n.* 102 (1854).—" Rappelle un peu le *L. striata*, Sw.," *Fée.*

***** *Sterile and fertile fronds bipinnate, or pinnate with pinnæ deeply pinnatifid.*

54. L. *volubilis*, Hook.; caudex . . .? stipes . . .? fronds 20 feet long twining bipinnate, pinnæ deltoideo-cordate very distant and as well as the pinnules petiolate; *sterile* pinnæ with 3–9 pinnules of which the terminal one is rather the largest and also petiolate, all of them 4–6 inches long 1–1½ inch in diameter subopposite oblong submembranaceous obtuse at the base sharply acuminate serrated only at the apex horizontal, veins very numerous simple or forked forming delicate transverse lines which unite with the slightly thickened margin, petiole inarticulate, *fertile* pinnæ with fewer pinnules (2–5) equally petiolate elongated narrow-linear falcate acuminate 6–14 inches long 3-nerved on the back, to the 2 outer nerves near the costa the involucre is attached, dark-brown membranaceous soon breaking transversely into segments, the sori spreading, rachises furrowed above twining round each other scarcely so thick as a goose-quill stramineous glossy free from scales as is the whole frond. (Tab. CL.)

Hab. Barra do Rio Negro, tributary to the Amazon, in thickets by streams, climbing to the height of 20 feet, *R. Spruce*, *n.* 1263.—This is certainly the most remarkable of the genus *Lomaria* which it is my privilege to describe, with much the habit of *Blechnum* (Salpichlæna) *volubile*, Klfs. There are species of *Lomaria* with scandent caudices or rhizomes which measure 20–25 feet, but



here that length is attained by the frond itself, or rather the main rachises of the frond, which, having considerable intervals free from the pinnæ, twine round each other, as well as over and among bushes (perhaps much after the manner of *Lygodium*), intermingling, as it would appear, sterile and fertile fronds, so that it is difficult to trace the pinnæ to their respective rachises. Of the true caudex, and even stipes, we know nothing. The primary petioles, which are quite inarticulate, are often nearly opposite, 2 inches and more long, and stand out at right-angles from the rachis. The fertile pinnæ have always fewer pinnules, and they exceed those of the sterile ones in length, being more than twice as long, and generally very falcate. A folio page would not suffice to do justice to a figure of this fine species.

55. L. *Fraseri*, A. Cunn.; caudex elongated suberect stout clothed with remains of old stipites except at the extremity where it is quite paleaceous with curly brown scales from below which a fascicle of fronds arises from 1–3 feet in height (including the stipes), each frond is ovate-lanceolate acuminate firm-membranaceous, *sterile* ones pinnate, pinnæ 2–3 inches long lanceolate acuminate deeply almost to the rachis pinnatifid, the bases decurrent into a pinnatifid wing which unites the pinnæ at the base, segments oblong very acute entire or serrated horizontally patent opaque, veins very indistinct few simple or once or twice forked, *fertile* fronds equal in size to the sterile ones bipinnate, pinnules small scarcely 3–4 lines long oblong, sori almost orange-coloured spreading over the whole surface beneath, involucre rather narrow membranaceous pale-brown, main rachis with a narrow wing having here and there an oblong spreading lobe or segment, stipes 4–5 inches long stramineous bearing small toothed lobes (or abortive pinnæ), its base more or less paleaceous.—*All. Cunn. Pl. of N. Zeal. in Comp. to Bot. Mag.* ii. *p.* 364. *Hook. Ic. Pl. t.* 185. *Hook. fil. Fl. N. Zeal.* ii. *p.* 32. *Brack. Fil. U.S. Expl. Exp. p.* 128.

Hab. Forests in the Northern Island of New Zealand, *Fraser*; at Wangaroa and Hokianga, etc., *All. Cunningham, Colenso, Sinclair, J. D. Hooker, and others*; Massacre Bay, Cook's Straits, *Dr. Lyall*.—This and the species immediately preceding are the most compound of all the *Lomariæ*, and certainly the best-marked among them, yet having little affinity the one with the other. The fertile pinnules are not half an inch in length, and very numerous and crowded. I have spoken of the sterile pinnæ as being pinnatifid, but they may almost be said to be again pinnate, for at the sinus, and reaching quite to the rachis, there is a pellucid membrane, quite unlike the opaque substance of the frond, which unites these pinnules at the base. By mistake Mr. All. Cunningham has described the caudex as "scandent;" and it is by mistake stated in 'Icones Plantarum,' that Fraser mentions having seen the caudex 20 feet in length. His MS. note, in my herbarium, is "10 feet." Dr. Hooker and Mr. Brackenridge speak of it as ordinarily 2–3 feet long, but erect or nearly so, with quite the habit of a Tree-fern, and with Brackenridge's party it was always known by the name of "the miniature Tree-fern."

Species of Lomariæ, *so called, altogether doubtful, or belonging to other genera.*

L. aculeata, *Bl. En. Fil. p.* 205, *is* Lomariopsis spinescens, *Fée.*

L. acuminata, *Desv.*, *is* Lomariopsis acuminata, *Fée.*

L. alata, *Kze.*; *Fée in Gen. Fil.* (name only).

L. ambigua, *Fée* (not of Hook. as stated in Fée's Index), *is* Blechnum ambiguum, *Kaulf.*

L. aurea, *Wall.*, *is* Onychium auratum, *Klf.*

L.? caruifolia, *Wall.*, *is* Onychium auratum, *Kaulf.*

L. decomposita, *Desv.*, *is* Lomariobotrys decomposita, *Fée.*

L. deflexa, *Liebm. Fil. Mex. p.* 84; imperfectly described from sterile fronds.

L. campylotis, *Kze.*, *is* Blechnum glandulosum, *Lk. et Klfs.*, and a var. of Blechnum occidentale, *L.* (*fide Mett.*).

L. eriopus, *Kze.*, *is* Stangeria paradoxa (Cycadaceæ).

L.? gracilis, *Bl. En. p.* 205, *is* Stenochlæna gracilis, *Kze. in Bot. Zeit.* vi. *p.* 142.

L.? Hænkeana, *Pr. Tent. Pterid. p.* 143, *is* Stenochlæna Hænkeana, *Pr. Epim. p.* 165.

L. hastata, *Kze.*, *is* Blechnum hastatum, *Klfs.*

L. juglandifolia, *Pr. l. c. p.* 143, *is* Stenochlæna juglandifolia, *Pr. Epim. p.* 164.

L. linearifolia, *Pr. Tent. Pterid. p.* 143. Undescribed, unless it be printed by mistake for L. linariæfolia, *Pr.*

L. Meyeriana, *Kze.*, *is* Stenochlæna Meyeriana, *Pr. Epim. p.* 166 (Lomariobotrys, *Fée*).

L. pubescens, *Kze.*, *is* Blechnum pubescens, *Hook. Ic. Pl. t.* 97 (Bl. hastatum, young).

L. pumila, *Klfs.* (not Raoul), *is* Blechnum australe, *L.*

L. salicifolia, *Fée, Gen. Fil. p.* 68 (name only), not of Kze., *is* Parablechnum salicifolium, *Pr. Epim. p.* 110; "frondе oblongo-lanceolata pinnata, pinnis integerrimis basi acutis, inferioribus petiolatis, mediis sessilibus, superioribus basi inferiore adnatis, sterilibus lineari-lanceolatis acuminatis, fertilibus anguste linearibus acutissimis, rachi lanuginoso-paleaceo, costis subtus villoso-paleaceis."—Hab. Natal.

L. salicifolia, *Kze. in Linnæa*, ix. *p.* 58; being compared by the author with L. sorbifolia *of Kaulf.*, *is* probably a Lomariopsis, *Fée.*

L.? serpens, *Wall. Cat.*, *is* Gymnopteris axillaris, *Pr.*

L. spondiæfolia, *Wall. Cat. n.* 87, *is* Stenochlæna spondiæfolia, *J. Sm. and Pr. Epim. p.* 165.

L. spicata, *Willd.*, *is* Hymenolepis ophioglossoides, *Klfs.*

L. tenuifolia, *Desv.*, *is* Lomariobotrys tenuifolia, *Fée.*

2. Blechnum, *Linn.*

(Hook. Gen. Fil. tab. LIV. B., and tab. XCIII., Salpichlæna.) *Willd. Sw. Presl* (*Tent. Pterid.*). Blechnum, Parablechnum, Mesothema, Spicanta, Blechnopsis, *Presl* (*Epim. Bot.*). Salpichlæna, *J. Sm.*

Sorus linear, continuous, rarely interrupted, parallel with and near the costa, or between the costa and the margin. *Involucre* taking the same form as the sori, never formed by an expansion of the margin, membranaceous or more or less fornicate or involute. *Veins* free, simple or forked, in *Salpichlæna* terminating in the thickened margin of the pinnules, rarely subanastomosing at or near the sori, which latter run transversely with the veins. — *Tropical or extratropical, scandent in the section, or subgenus*, Salpichlæna. Caudex *more or less repent, rarely erect and subarborescent.* Fronds *uniform, rarely of two kinds, sometimes slightly dimorphous, the* fertile segments *or* pinnæ *subcontracted; varying in size, chartaceous or subcoriaceous, simple or pinnatifid, more generally pinnate, rarely bipinnate.*

I have already alluded, under the preceding genus *Lomaria*, to the close affinity between that and *Blechnum*: so great, indeed, that Schlechtendal united the two genera, and he has been followed by other able pteridologists; whilst Presl, in his latest work on the Ferns, has broken up both *Lomaria* and *Blechnum* into a multitude of other genera on very slight grounds. *Salpichlæna* of J. Sm. is separated from *Blechnum* mainly by its scandent habit (like that of our *Lomaria scandens* in *Lomaria*), and its more fornicate or involute involucre, which breaks up into segments of various lengths.

* *Fronds pinnatifid or pinnate, rarely simple.* Eublechnum.

† *Fronds pinnatifid, at least in their upper half.*

1. Bl. *Brasiliense*, Desv.; caudex erect stout 1 foot and

more long subarborescent crinite at the summit with dense very long black glossy subulato-setaceous scales which also entirely clothe the very short stout stipes, fronds forming a noble crown 1–4 feet long nearly sessile in outline obovato-lanceolate acute rather than acuminate long-tapering at the base subcoriaceous deeply almost to the rachis pinnatifid (subpinnate), segments 6–8 or 10 inches long, from a broad base linear-lanceolate acuminate serrated often falcate, the lower ones short oblong or ovate or even semiorbicular, and the lowermost of these are more or less distinct (free) but sessile and adnate scarcely decurrent, veins forked once or twice rather close parallel each veinlet extending to a serrature of the margin, sori continuous close to the costa narrow, involucres narrow membranaceous brown. (TAB. CLVII.) —*Desv. in Berl. Mag.* v. *p.* 330. *in Mém. Soc. Linn. Par. t.* 283. *Kaulf. En. Fil. p.* 159. *Metten. Fil. Hort. Lips. p.* 63. Bl. Corcovadense, *Raddi, Fil. Bras. p.* 54. *t.* 61 *and* 61 *bis.* Bl. nitidum, *Presl, Del. Prag.* i. *p.* 187 (*not Reliq. Hænk.*).

Hab. Brazil; abundant in the vicinity of Rio, *Raddi, Boog, Burchell, M'Gillivray and Milne, M'Rae, Gardner, n.* 47. S. Brazil, *Sellow, Mr. Fox.* Tarapota, Eastern Peru, *Spruce, n.* 4673.—This Fern, almost peculiar to Brazil, and most plentiful, as it would appear, in the vicinity of the coast, is very distinct in its outline, in the attenuated *base* of the frond, with its short, blunt pinnules extending nearly to the caudex, and only leaving a very short stipes densely clothed with long, setaceous or crinite, glossy scales. In the figure given by Raddi, these long, dense, bristle-like scales at the base of the stipes are omitted, one of the more remarkable features of the species.

2. Bl. *cartilagineum*, Sw.; "caudex oblique densely paleaceous with ovate black scales," stipes pale-brown a span or more long angled black having many broad-subulate black scales, fronds 1–2 feet long oblong-ovate acuminate pinnatifid (pinnate below) membranaceo-coriaceous, segments numerous remote especially the lower ones from a broad base linear-lanceolate acuminate sharply serrate decurrent at the inferior base and produced at the superior forming generally an acute angle in the sinus, veins close-placed simple or forked, sori continuous close-pressed to the costa.—*Sw. Syn. Fil. pp.* 114 *and* 312 (*not Schkh.*). *Br. Prodr. p.* 152. *Willd. Sp. Pl.* v. *p.* 411. *Mett. Fil. Hort. Lips.* 63. *t.* 5. *f.* 1–5 (*excellent*). *Sieb. Syn. Fil. n.* 123 (*in Herb. Nostr.*). Blechnopsis, *Pr. Epim. Bot. p.* 116.

Hab. N. Holland, Port Jackson, *Brown, Bauer, Sieber, J. D. Hooker.* Scaler's Cove, Victoria, *F. Mueller.* King George's Sound, *Hügel* (*Presl*).—The very pinnatifid character of this species allies it to the following, *Bl. nitidum*, a species

confined mainly to the Malay Islands and Archipelago, whereas this seems peculiar to the southern shores of Australia, from Port Jackson in the east to King George's Sound (*Hügel*), in the west. It is of a far more slender habit than the species just mentioned, with narrower and more remote segments, and is very correctly figured by Mettenius, l. c. A comparison of that figure with those we here give of *Bl. nitidum* (Tab. CLV.), and its var. *contracta* (Tab. CLVI.), will enable any one to judge how far we have done right in keeping them distinct.

3. Bl. *nitidum*, Pr.; caudex . . . ?, fronds ample 1½–3 feet oblong-ovate in circumscription truncate at the base firm-coriaceous pinnatifid almost to the rachis, segments very numerous approximate linear-lanceolate acuminate more or less falcate sharply serrated, lower ones almost equal in length to those above them and free (so that the fronds are pinnated below), veins very close simple patent, sori close to the costa continuous from the base to near the apex, stipes elongated nearly free from scales, rachis 2-furrowed beneath. (Tab. CLV.)—Var. *contracta*; inferior segments and pinnæ suddenly contracted above the broad base, and the contracted portion only fertile. (Tab. CLVI.)—*Pr. Reliq. Hænk.* i. *p.* 49 (*excl. syn. of Desv., and of Pr. Del. Prog.* i. *p.* 187). *J. Sm. in Hook. Journ. Bot.* iii. *p.* 406. Bl. elongatum, *Gaud. in Freyc. Voy. Bot. p.* 395 (*fide Presl*). Bl. (occidentale?) confluens, *Schlecht. in Linnæa*, v. *p.* 613? Bl. aduncum, *Liebm. Fil. Mex. p.* 85? Blechnopsis nitida, *Pr. Epim. Bot. p.* 116.

Hab. Isle of Sorzogon, Luzon, *Hænke*. Mishmee, *Griffith*. Mexico?, *Schiede and Deppe, Liebmann*. South Brazil, *Tweedie*, n. 1122. Guam, Marianne Islands, *Gaudichaud*.—Var. *contracta*. Luzon, *Cuming*, n. 164. Boyd's Creek, Isle of Gaudalcomar, in woods, *Milne, in Denham's Voyage of H.M.S. Herald*.—This species has no small affinity with the Australian *Bl. cartilagineum* of Swartz and Brown, as already intimated, but is much larger in all its parts, with much broader and more closely-placed segments, and wanting the produced and almost lobed bases in the broad sinuses of that species. Presl, the author of the species in the first instance, confounded it with *Bl. Brasiliense*, and published it as such, changing the name *Brasiliense* to a not very appropriate one, *nitidum*. He detected his error, however, for though the upper part of the frond in our plant resembles *Bl. Brasiliense*, it differs most widely in not having the lower pinnæ contracted or dwarfed, and he introduced it as a distinct species in his 'Epimeliæ Botanicæ,' and referred to it the *Blechnum*, n. 164, of Mr. Cuming, from Luzon. Those specimens, however, are, as well as Mr. Milne's from Boyd's Creek, a peculiar variety of the present, having the fertile segments remarkably contracted above the base, so as to be almost lomaroid. My Mishmee specimens, I cannot doubt, are the normal state; and what is very remarkable, I have from Tweedie, gathered in S. Brazil, a species so closely resembling, that I am compelled, as it were, to refer it here. Schlechtendal, indeed, l. c., has noticed a *Blechnum* from Mexico which he calls *confluens*, but doubtfully refers to *occidentale*, with the remark, "Ab omnibus specimnibus *Bl occidentalis* collatis, hæc unico charactere diversum, folio pinnatifido nec pinnato; pinnis basi semper confluentibus nec discretis, auriculatis." Liebmann, judging by his reference to Schlechtendal, seems to have detected the same plant.

4. Bl. *polypodioides*, Raddi; caudex elongated thick ascending radiculose more or less scaly at the summit, stipites slender 2 inches to a span and more long rufo-paleaceous below, fronds a span to a foot long lanceolate acuminate generally gradually attenuated below coriaceo-membranaceous deeply almost to the rachis pinnatifid pinnate below with 2–3 pairs of the lowest pinnæ abbreviated and triangular, the segments from a broad subauriculate adnate base (forming very acute sinuses) oblong subfalcate horizontal approximate almost pectinated acute ultimate ones confluent into a lanceolate apex, costa and rachis semiterete minutely pubescent, sori abbreviated generally very much so (hence asplenioid) costal unequal or the superior one wanting, veins obscure rather lax often forked.—*Raddi, Syn. Fil. Bras. n.* 20. *Fil. Bras. p.* 53. *t.* 60. *f.* 2 (*excellent*). *Mett. Fil. Hort. Bot. Lips. p.* 63. *Kze. in Schkh. Fil. Suppl. p.* 130. *t.* 58. *f.* 1? (*excl. a*). Bl. unilaterale, *Willd. Sp. Pl.* v. *p.* 407. "*Willd. Berol. Mag.* iv. *p.* 79. *t.* 3. *f.* 1." *Pr. Epim. Bot. p.* 104. Bl. scabrum, *Liebm. Fil. Mex. p.* 84. Asplenium blechnoides, *Sw. Syn. Fil. p.* 76.

Hab. Probably frequent in the whole of tropical and subtropical America; from Mexico, *Galeotti* (regione frigida), *Liebmann, etc.* W. India Islands, St. Domingo, *Ritter.* Jamaica, *Purdie.* Venezuela and New Granada, *Funck, Fendler, etc.* Peru, *Pavon, Lagasca, Lechler.* Eastern Peru, Tarapota, *Spruce.* Guiana, *Schomburgk and others.* Brazil, particularly abundant, even to South Brazil.—A variable plant in size and in length of the stipes, and also in the length of the sori, being more or less abbreviated, frequently reduced to one sorus on a segment, and that is on the lower side of the costa. Small specimens with the short stipites border very closely upon *Bl. asplenioides.* Kunze, I think, has confounded the two; his var. *angustior*, of Pœppig's Peruvian specimens, in my herbarium, belong to our next but one species, *B. asplenioides*, under which the differences will be noticed.

5. Bl. *heterocarpum*, Fée; "fronds pinnatifid elliptical-lanceolate resembling *Polypodium vulgare* but sessile, nervils pinnate flexuose, basal superior nervil extended, rhizome creeping, stipes short, intermediate segments lanceolate mucronate, lower ones semiorbicular terminal ones angled elongate the margin waved, sporothecia multiform, costal ones normal, lateral ones shorter asplenioid, superior ones linear interrupted, indusium very narrow membranaceous thin, sporangia elliptical on short pedicels, spores ovoid and reniform." *Fée, Gen. Fil. p.* 74.

Hab. Brazil, *Claussen.*— "Allied to *Bl. polypodioides*, Raddi."

6. Bl. *asplenioides*, Sw.; caudex in the older specimens

thick ascending bearing numerous fibrous radicles, fronds numerous tufted sessile or with short stipites (1–2 inches long) narrow-lanceolate acuminate much and gradually tapering below deeply pinnatifid 3 inches to a span long, coriaceo-membranaceous, segments numerous patent triangular-ovate or oblong generally obtuse several pairs of the inferior ones very short small and acutely triangular all confluent, those at the summit gradually smaller and at length forming an acuminated apex, veins lax often forked, sori abbreviated in the smaller specimens solitary and confined to the under side of the rachis, in the apex double.—*Sw.* "*Vet. Ac. Handl.* 1817, *p.* 73." *Klotzsch, in Linnæa*, xx. *p.* 348. *Presl, Epimel. Bot. p.* 104. Bl. ceteracinum, *Raddi, Syn. Fil. Bras.* 52. *t.* 60. *f.* 1. B. polypodioides, var. fronde angustiori, *Kunze in Linnæa*, ix. *p.* 60 (*according to a specimen in Herb. Nostr., and I think also Kze. in Schkh. Fil. Suppl. t.* 58. *fig.* 1 *a, and probably fig.* 1 *itself*). Bl. angustifrons, *Fée, 8me Mém. Foug. p.* 25. *t.* 9. *f.* 2?

Hab Brazil, Rio Janeiro, *Radde, Mikan.* Goyaz, *Pohl.* Minas Geraes, *Gardner*, 5384. British Guiana, *Richard Schomburgk*, *n.* 1142. Mexico, *Galeotti!* (*Fée*). Peru, *Poeppig* (received from Kunze with the name *Bl. polypodioides*), *Matthews*, *n.* 1807. Panama, *Seemann.* Antioquia, N. Granada, *Purdie.*—We have already spoken of the affinity of this plant and *Bl. polypodioides*, Raddi, and, indeed, it is the var. *angustior* of that species of Kunze in the Linnæa, l. c; and I suspect also that his figure in Schkuhr's Fil. Suppl. t. 58, letter *a*, if not also fig 1, should be referred here. The distinguishing characters I find to be in the smaller, usually sessile fronds, very narrow-lanceolate, gradually and long tapering to the base, with no free pinnules, everywhere, to the lowest segment, pinnatifid, the small, abbreviated ones below numerous, the shorter sori, and generally the absence of one (the uppermost on the segment), save at the apex where the sorus is double. My specimens from seven different localities, are very constant to these characters. A neat and peculiar state of this plant is exhibited in Mr. Purdie's specimens from Antioquia, which form small stellated tufts, the fronds scarcely 2 inches long, quite sessile, with never more than a solitary sorus on a lobe, except at the apex. Although perfect as to fructification, the tufts are evidently young, the root consisting of fibres, no caudex being formed. In the present and the preceding species, stout fibres or runners become sarmentose, and produce new plants. In both, too, we find that the young sori are more or less remote from the costa.

7. Bl. *triangulare*, Lk.; "rhizome obliquely ascending clothed with ovate scales, petiole 2–3 inches long glabrous, frond 8–15 inches long coriaceous glabrous lanceolate pinnatisected, segments many pairs contiguous 8 lines to 1 inch long 3–4 lines wide the base broad produced above adnate, lowest ones remote their lower base more or less free (distinct), their upper base produced and adnate oblong or rotundate submucronate, superior segments from a wider

base gradually attenuated acuminate falcate roughish and entire, veins numerous as in the *Eupterides*, sori appressed to the continuous, indusium membranaceous." *Metten.*—*Link, Sp. Fil. p.* 78. *Presl, Epim. Bot. p.* 105. *Metten. Fil. Hort. Bot. Lips. p.* 63.

Hab. Mexico.—I possess no specimen of this plant, and have only seen cultivated ones in the herbarium of Mr. J. Smith, which, being from the Berlin garden, may be considered authentic. The fronds are a foot long, deeply pinnatifid almost to the rachis, the segments invariably opposite, horizontally patent, dilated at the base, and forming a very acute angle in the sinus. It has some affinity with my *Bl. Fendleri*, but the segments are quite glabrous and numerous. It may possibly be a more perfect state of *Bl. Fendleri*. Preal refers to this species the *B. polypodioides* of Klotzsch in Linnæa, xx. p. 309, in part, and adds the habitat of "Rio Janeiro."

†† *Fronds pinnate, rarely simple or undivided.*

8. Bl. *Lanceola*, Sw.; caudex short creeping substoloniferous, fronds 2–6 inches long lanceolate subattenuate at the base, simple, or sometimes bearing below the base 2–4 small auricles, veins in parallel lines generally twice forked, sori close to the costa, stipites slender 2–4 inches long stramineous slightly paleaceous.—*Sw. K. Vetenskaps Acad. Handl.* 1817, *p.* 72. *t.* 3. *f.* 2. *Hook. Bot. Mag. t.* 3240. *Ic. Plant. t.* 970. *Kze. in Schkh. Fil. Suppl. p.* 126. *t.* 57. *f.* 1. Bl. lanceolatum, *Raddi, Fil. Bras. p.* 52. *t.* 69. *f.* 3. Bl. trifoliatum, *Kaulf. En. Fil. p.* 157 (*var.* subpinnata).

Hab. Bogota, about Rio, *Raddi*, *Sellow*, *Gardner*, n. 50; *J. D. Hooker*, *M'Gillivray and Milne*, *Brackenridge*. Tarapota, Eastern Peru, on the Campana Mountain, *Spruce*, n. 4672. Boqueta, Veraguas, *Seemann* (small, pinnated, with 2–4 small pinnæ).—A very neat and elegant, small species, of which the normal state appears to be quite simple; occasionally there are 2–4 small pinnæ a little below the primary pinna or frond, which then constitutes a large, terminal pinna.

9. Bl. *plantagineum*, Pr. (under *Mesothema*); "fronds simple glabrous minutely cartilagineo-serrulate acute at the base, *fertile* linear angustato-acute, *sterile* linear-lanceolate twice as broad as the fertile." *Pr.*—Mesothema plantagineum, *Pr. Epimel. Bot. p.* 111. Blechnum Lanceola, *Hort. quorund.* (*Pr.*).

Hab. "Brazil (*ex Hortulanis*)."—"Very much resembling *Blechnum Lanceola*, but differs in the sori being remote from the costa and running near the middle of the side of the frond for its whole length, except at the base. The fronds, too, are longer, remotely denticulate, the veins fewer." Preal had not seen native specimens.

10. Bl. *intermedium*, Link; "frond ovate subsimple tri-

foliate or pinnate and bi- or trijugate with the margin scabrous, terminal pinna (very large) oblong-lanceolate rather obtuse, lateral ones subsessile elliptical or oblong obtuse or roundish, superior ones often auriculiform, stipes of middling length roughish a little paleaceous at the base, caudex short horizontal branched stoloniferous sparingly fusco-paleaceous." *Kze.—Link. Hort. Reg. Berol.* ii. *p.* 75. *Kze. in Schkh. Fil. Suppl.* i. *p.* 128. *t.* 57. *f.* 2. *Mett. Fil. Hort. Lips. p.* 62. *Liebm. Fil. Mex.* p. 86.

Hab. Brazil, *Sellow* (*Presl*). Cumana, Columbia, *Moritz*, *n.* 126. Mirador, Mexico, *Liebmann*, *Linden*, *n.* 72, and *Galeotti*, *n.* 6302 (*all in Herb. Nostr.*). Guatemala, *Skinner* (*in Herb. Nostr.*).—I have no well authenticated specimen of this species in my herbarium, but Liebmann's specimens quite agree with the figure and description of Kunze. It is probably named *intermedium* as forming the connecting link between some of the pinnated vars. of *Bl. Lanceola* and our next species, *Bl. gracile*. But it is indeed a much larger and stouter plant than the former, has an obtuse base to the terminal pinna, and the lateral pinnæ are more fully developed, but not always obtuse. It will be more difficult to distinguish it from *Bl. gracile*.

11. Bl. *gracile*, Klfs.; "frond 4–5 inches pinnate 4-jugate, pinnæ an inch or an inch and a half long lanceolate subfalcate shortly petiolate the margin minutely denticulate, terminal one 2 inches long on one side auriculato-adpendiculate, sterile ones broader, stipes 4 inches long filiform chaffy at the base, sori close to the costa neither extending to the base nor to the apex sometimes interrupted on the terminal pinnule." *Klfs. En. Fil. p.* 158.—*Fée, Gen. Fil. p.* 73. *Kze. in Linnæa*, ix. *p.* 6. *Mart. et Galeot. Fil. Mex. p.* 51. *Presl, Epim. Pl. p.* 108. *Kl. in Linnæa*, xx. *p.* 349. *Brack. Fil. U.S. Expl. Exp. p.* 129.

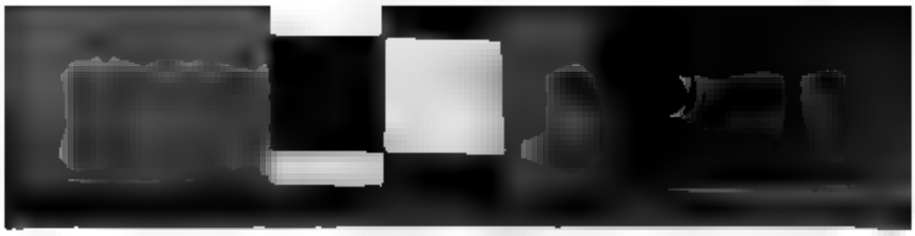
Hab. Brazil (*Otto*, specimen above characterized by *Kaulfuss*), *Sellow*, *Brackenridge*. Peru, *Pœppig* (*Kze. in Herb Nostr.*, frond almost a foot long 10-jugate), *Matthews*, *n.* 1806. B. Guiana, *R. D. Schomburgk*, *n.* 1177 (*Klotzsch in Herb. Nostr.*). Mexico, *Jurgensen*. Venezuela, *Fendler*, *n.* 113.—Presl gives several other localities, but I know not what dependence is to be placed upon them: for example, he refers "*Gardner*, Brazil, *n.* 184," hither, but I have always considered that plant to be a form of *Bl. occidentale*; and on the other hand, he brings under this species Galeotti's *Blechnum*, *n.* 6302, which I place under *Bl. intermedium*. Indeed, I find great difficulty in referring this group of pinnated *Blechna* to the respective species of the genus. Kaulfuss's description of his *Bl. gracile* appears to me to accord much better with *Bl. intermedium* of Link, than with what I receive from Germany as *Bl. gracile*; and Kaulfuss expressly says of it, "*Bl. Lanceola*, Sw., et *Bl. trifoliatum*, Klfs., forte nil quam hæc stirps, ætate juvenili," which he would hardly have said of the large, multipinnate forms, so often considered to be *Bl. gracile*. Such, as it seems to me, may more correctly be considered as a passage to *Bl. longifolium*.

12. Bl. *Fendleri*, Hook.; caudex very slender creeping or

ascending almost filiform branched incrassated and scaly at the extremity bi-triceps, stipites stramineous slender filiform sparse a span long destitute of scales downy, fronds ovato-deltoid 4–5 inches long thin membranaceous pellucid and minutely pellucidly dotted pinnate, pinnæ rather distant 7–9, lateral ones 2 inches long opposite subfalcate obtusely acuminate quite entire minutely villous decurrent at the inferior base (except the lowest pair), superior base with a sharp auricle appressed to the rachis, in the upper pair adnate with the rachis and confluent with the base of the long terminal pinna which is nearly 3 inches long, veins lax remote simple or forked near the base not unfrequently anastomosing so as to form a distinct areole near the base of the line of fructification, the very base parallel with the rachis free from veinlets, sori forming two slender lines close by the costa, the inferior one diverging from the costa at the base, involucres hairy like the frond. (TAB. CLVIII.)

Hab. Tovar, Venezuela, *Fendler*, 1854–5 (*Plantæ Venezuelæ*), *n.* 116.—Whether this be really a good species or not I am unable to say. It exhibits peculiarities which prevent me from referring it to any other known to me, but which are better understood by a reference to the figure than by any verbal description. The specimen is a solitary one with the two fronds here represented; the caudex or rhizome, and the comparatively long stipes, are alike slender and filiform. The frond is remarkably membranaceous, subpellucid, and full of pellucid, closely-packed dots, sparingly villous on both sides. The pinnæ are opposite, auricled at the base above. The terminal pinna is much elongated, and its base is confluent with the superior bases of the uppermost pair of pinnæ. The venation slightly anastomoses at the base of the pinnæ, so as to form areoles, showing an affinity with *Woodwardia* and *Doodia*. The lines of fructification are close to the costa, and the inferior line, at its base, diverges and follows for a little way the decurrent base of the pinnule, but does not extend to the rachis. The primary veins (near the base) produce veinlets only on the inner side; the basal portion of the pinnæ next to the rachis is veinless.

13. Bl. *longifolium*, H.B.K.; rhizome short thick clothed with fibres below, sparingly paleaceous above, frequently stoloniferous, stipites stramineous subfasciculate 3–4 inches to a foot and more long, frond from ½ to 1½ foot long subdeltoideo-ovate pinnated with usually few pinnæ 5–7 or 10 (rarely 15–20) of which the terminal one is very long (and generally the broadest) from 4–5 inches to 8 or 9 not unfrequently auricled below or coadunate with the nearest lateral pinna and then petiolate some with 3 or 4 rounded lobes (pinnatifid) below more or less obtuse at the very base, the rest from 2 to 6 inches long by 3–4 lines broad, spreading entire all of them linear-lanceolate sessile superior ones often decurrent but free, of a dark-green hue satiny and sub-



pellucido-membranaceous texture, slightly scabrous at the edge, acuminate subfalcate, veins forming close parallel fine lines simple or forked, sori close to the costa continuous not unfrequent on the lobes of the terminal pinna. (TAB. CLIV.)—*H.B.K. Gen. et Sp. Am.* i. *p.* 13. *Willd. Sp. Pl.* v. *p.* 413. *Hook. Bot. Mag. t.* 2818 (smaller form, to which perhaps both *Bl. gracile*, Klfs., and *Bl. intermedium* of Link, should be referred). *Fée, Gen. Fil. p.* 73. *Pr. Epim. Bot. p.* 108. Bl. Meridense, *Kl. in Linnæa*, xx. p. 209. *Fée, Gen. Fil. p.* 73. *Pr. Epim. Bot. p.* 108.—Var. *robustior*; larger stouter more coriaceous and opaque, pinnæ sometimes an inch and more in diameter, rhizome above and base of the stipes more scaly.—Bl. Schlimense, *Fée, 8me Mém. Foug. p.* 71.

Hab. Venezuela, abundant, *Humboldt and Bonpland, Fendler*, n. 114 and 115, and 113 (this last has the fertile frond of the ordinary character, but the sterile one, from the same rhizome, is referable to var. *robustior*). Trinidad, *Lockhart*. St. Vincent, *Dr Wright*. New Granada, St. Martha, Sierra Nevada, *Purdie*. Galipan, *Moritz*, n. 24 (the *Bl. Meridense*, Kl.). Tarapota, in Eastern Peru, *Spruce*.—Var. *robustior*. San Augustin, Cumana, *Funck*, n. 212. Ocaña, New Granada, *Schlim*, n. 752. La Paila, *Holton*, n. 59. Antioquia, *Mr. Jervise*. Venezuela, *Fendler*, n. 113.—Whatever may be the fate of the two preceding species (I am not at present disposed to think that *Bl. Lanceola* can merge into them), the present must be retained as the first described, the *B. longifolium* of Humboldt, Bonpland, and Kunth In deference to so many able botanists, I have retained the *Bl. gracile* of Kaulf. and the *Bl. intermedium*, but I do not see how they differ from small specimens of *Bl. longifolium*, and even from the ordinary specimens of this plant. There is yet a variety (my var. *robustior*), of which the extreme specimens look at first sight as different from it as that is from *Bl. intermedium*; but copious individuals show a gradual passage from the one extreme to the other. Our present figure represents what may be considered the normal form of the plant, and every one can judge for himself how far the other supposed species described are deserving of being retained as such.

14. Bl. *occidentale*, L.; caudex or rhizome thick paleaceous often stoloniferous, stipes 4–12 inches long paleaceous at the base with ovate acuminated scales often as well as the rachis glanduloso-pubescent, frond ovato-lanceolate acuminate membranaceo-coriaceous glabrous or when young somewhat hairy pinnated, pinnæ 2–4 or more inches long numerous approximate often opposite sessile truncate at the base and then frequently auricled above acute or acuminate often falcate the edge subcartilaginous entire or scabrous with very minute serratures, above the middle their base becomes adnate to the rachis and confluent with the adjacent ones so that the frond here is pinnatifid and terminates in an acuminated serrated point or in an entire more or less elongated lobe, veins sim-

ple or once or twice forked, sori continuous rarely interrupted. —*Linn. Sp. Pl. p.* 1534. *Jacq. Ic. Rar.* iii. *t.* 869 (*excellent*). *Sw. Syn. Fil. p.* 113. *Willd. Sp. Pl.* v. *p.* 412. *Raddi, Fil. Bras. t.* 53. *Pr. Epim. Bot. p.* 105. *Hook. Gen. Fil. t.* 54 *B. Metten. Fil. Hort. Lips. p.* 62. B. cartilagineum, *Schk. Fil. t.* 108 *b* (*excellent*). Filix minor, etc., *Sloane, Jam.* i. *p.* 87. *t.* 44. *f.* 2. Lonchitis juxta nervum pulverulenta, *Plum. Fil. t.* 62. *f.* B.—Var. *caudata;* fronds terminating in a long-acuminated entire lobe. Bl. caudatum, *Cav. Prælect.*, 1801. *n.* 649 (*not Sw.*). *Pr. Epim. Bot. p.* 106.—Var. *pectinata;* fronds narrower, smaller pinnæ narrow and more approximate, the lowest ones only free. Bl. pectinatum, *Hook. Ic. Pl.* i. *t.* 95 (*not Pr., which is* Blechnopsis, *Pr. Epim. Bot. p.* 118). *Pr. Epim. Bot. p.* 105.—Var. *minor;* smaller in all its parts, pinnæ shorter in proportion ovato-oblong. Bl. glandulosum, *Link, En. Hort. Bot. Berol.* ii. *p.* 462. *Kaulf. En. Fil. p.* 160. *Pr. Tent. Pterid. p.* 103. *Wall. Cat. n.* 56. *Kze. Fil. Schkh. Suppl. p.* 13. *t.* 85. *f.* 2 (*excellent*). *Pr. Epim. Bot. p.* 104. Bl. Pohlianum, *Presl, Tent. Pterid. p.* 103. *t.* 11. *f.* 11. Bl. caudatum, *Pr. Rel. Hænk. t.* 1. *p.* 50 (*an Cav.?*). Bl. fasciculatum?, *Pr. Epim. Bot. p.* 106. Bl. cognatum, *Pr. Epim. Bot. p.* 107. Bl. distans, *Pr. Tent. Pterid. p.* 103 (*fide Kl. in Herb. Nostr.*). Lomaria campylotis, *Kze. in Linnæa,* xvii. *p.* 567, *and* xviii. *p.* 326. *Kl. in Linnæa,* xx. *p.* 344. Mesothema campylotis, *Pr. Epim. Bot. p.* 112. Bl. meridionale, *Pr. Epim. Bot. p.* 103.

Hab. Abundant in tropical America, from Mexico and the West Indian islands to South Brazil and Rio Grande do Sul (*Sellow, Fox*), on the Atlantic side, and to Chili (*Cuming, n.* 156, *fide Presl,* and 78, *fide Sturm*) on the Pacific side. Specimens were in Capt. Beechey's "Coral Island" collections, as stated in the Botany of Beechey's Voyage, but they were probably gathered somewhere on the American coast. Of the forms above noticed I possess var. *caudata,* from Brazil, *Gardner, n.* 184 (this is referred to *Bl. gracile* by Presl, and 1903). Demerara, *C. Parker.* Tarapota, E. Peru, *Spruce, n.* 3950. Galapagos, *Captain Wood.* Ecuador, *Cuming, n.* 1186; Panama, *Seemann.* Andes of Quito, *Jameson, n.* 13, and Tovar, Venezuela, *Fendler, n.* 111. This latter is almost intermediate in characters between *Bl. longifolium,* H.B.K., and our *Bl. occidentale,* and I can by no means satisfy myself that I am correct in placing it here.—Var. *pectinata* I possess only from Peru, *Mathews, n.* 1805.—Var. *minor,* which has the appearance of being young fronds, or, if I may so say, seedlings, I have from Tovar (*Moritz*), Venezuela (*Fendler, n.* 109); Mexico, *Liebmann* (as *Bl. glandulosum,* Lk., and as *Lomaria campylotis,* Kze., the latter with the pinnæ acutely auricled at the superior base); Panama (*Sinclair*), Guatemala (*Skinner*), Jamaica (*Purdie*), S. Brazil (*Sellow*), from Dr. Klotzsch, as *Bl. distans,* Pr.; in short, it is probably to be met with wherever the more fully developed states are found.—It is the fate of all species of Ferns which have a great geographical range to be multiplied into a number of imaginary species, sufficient allowance not being

made for variations depending upon different soils and climates, and elevations above the sea-level, temperature, and the degrees of moisture and dryness to which they may be exposed;—giving rise to errors which can only be corrected by an unprejudiced investigation of great suites of specimens from the various localities. These it has been my fortune to possess; still I am far from being satisfied that I have been correct in all the synonyms I have adduced under the several varieties of this "polymorphous species," as Kunze so justly calls it.

15. Bl. *orientale*, L.; caudex erect stout at the extremity and as well as the short stipites clothed with long falcato-subulato-setaceous glossy scales, frond 1–3 feet long ovato-lanceolate acuminate firm-coriaceous pinnated, pinnæ numerous approximate horizontal straight or decurved 6 inches to a foot long 3–4 lines broad linear-lanceolate gradually acuminate sessile entire the base bluntly and obliquely cuneate or truncated, several of the inferior pairs are suddenly abbreviated or abortive and squamiform, those at the extremity are decurrent and coadunate at the base, terminal one more or less elongated, veins simple rarely forked very close parallel horizontal, sori continuous close to the costa, involucre in age firm rigid and almost black.—*Linn. Sp. Pl. p.* 1535. *Sw. Syn. Fil. p.* 114. *Schkh. Fil. p.* 101. *t.* 109. *Willd. Sp. Pl.* v. *p.* 414. *Bl. En. Fil. Jav. p.* 197. *Metten. Fil. Hort. Lips. p.* 62. *Hook. Fil. Exot. t.* 77. Blechnopsis Cumingiana, *Pr. Epim. Bot. p.* 116. Blechnopsis latifolia, *Pr. l. c. p.* 116. Blechnum salicifolium, *Kaulf. En. Fil. p.* 160. Blechnopsis, *Pr. l. c.* Bl. pyrophyllum, *Bl. En. Fil. Jav. p.* 197. Blechnopsis orientalis, elongata, pyrophylla, *and* stenophylla, *Pr. Epim. Bot. pp.* 117, 118. Bl. agrostidifolium, *Goldm. in Nov. Act. Nat. Cur.* xix. *Suppl.* 459.—Var. *undulata;* pinnæ more approximate transversely undulated subcordate at the base finely acuminated at the extremity. Blechnum imbricatum, *Bl. En. Fil. Jav. p.* 198.

Hab. Eastern India, and Malay and Pacific Islands. Nepal, Sylhet, Assam, Sikkim, etc., *Wallich, Hooker and Thomson.* Madras Peninsula, *Dr. Wight.* Ceylon, *Gardner*, n 1085, *Mrs. Gen. Walker.* Luzon, *Cuming*, n 166 (pinnæ narrow and finely acuminate, and 165 —*Blechnopsis stenophylla*, Pr.); N. Ilocos, *Cuming*, n. 257; Moulmein, *Parish*, n. 14; Penang and Singapore, *Wallich, Cat.* n. 57, *Lady Dalhousie;* Amherst, *Wallich;* Java, *Blume, Millett, etc.;* Amboyna, (*Herb. Nostr.*); China, *Millett, Abel, Vachell;* abundant in Hongkong, *Champion*, n. 551, *Seemann*, n 2391, *Wilford.* Pacific Islands: Fiji and adjacent islands, *Harvey, Milne;* Fitzroy Islands, *M'Gillivray;* Coral Island, *Beechey;* Tahiti, *Banks, D'Urville.*— Var. *undulata:* Java, *Blume;* Borneo, *Barber.*—One of the best marked species of the genus, and it seems to hold the same place in Eastern India that *Bl. occidentale* does in tropical America. In almost every specimen I find the sudden dwarfing of several of the lowest pairs of pinnæ into mere orbicular, spreading, hard scales. An authentic specimen of *Bl. imbricatum*,

from Dr. Blume, satisfies me that it is a mere variety of *Bl. orientale*, with the pinnæ singularly transversely undulated.

16. Bl. *Finlaysonianum*, Wall.; caudex scarcely any (*Wall.*), stipes rather short, frond ample 2–4 feet ovato-lanceolate subcoriaceous pinnated, pinnæ erecto-patent rather distant 6–12–14 inches long 1 inch to 1¾ wide oblong or elongato-oblong (the width for the greater part of the length throughout the same and the sides parallel) sessile obliquely cuneate at the base entire upper ones much decurrent but (except the two supreme ones) not coadunate, the apex suddenly and sharply acuminated, several of the lowest pairs abortive reduced to small hard scales, the surface glossy, veins obscure compact parallel, sori close to the costa continuous narrow-linear, involucres also very narrow and indistinct.—*Wall. Cat. n.* 2172. *Hook. et Grev. Ic. Fil. t.* 225. Blechnopsis Finlaysoniana, *Pr. Epim. Bot. p.* 116.

Hab. Penang, *Finlayson, Thomas Lobb;* Singapore, *Cuming, n.* 370; Labuan, Borneo, *Motley.*—At the time Dr. Greville and myself figured and described this fine species, we had seen only one specimen. Others since received from Mr. Cuming, Mr. Thomas Lobb, and copious specimens from Borneo (Mr. Motley), have fully confirmed the validity of the species. Its nearest affinity is assuredly with *Bl. orientale*, than which it has much larger and broader, and more oblong and more distant pinnæ, suddenly forming an acuminated point, the base in the upper pinnæ much more decurrent, but rarely coadunate.

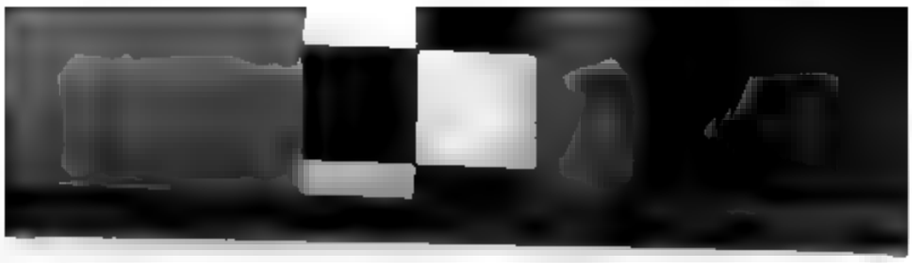
17. Bl. *pectinatum*, Br.; "fronds elliptical pinnate, pinnæ alternate sessile linear attenuated approximate coriaceous rigid cordate at the base, lowest ones small rotundato-reniform, rachis glaucous trisulcate above angled beneath." *Pr. Reliq. Hænk. p.* 51 (*not Hook.*).—Blechnopsis pectinata, *Pr. Epim. Bot. p.* 118. Blechnum lomarioides, *Gaud. in Freyc. Voy. Bot. p.* 396 (*fide Presl*), *not Metten.*

Hab. Marianne Islands, *Hænke, Gaudichaud.* — Notwithstanding that Presl retains this as a species, Gaudichaud seems to consider it a mere variety of *Bl. orientale*, Sw.

18. Bl. *Javanicum*, Bl.; "fronds pinnate coriaceous glabrous, pinnæ alternate sessile linear acuminate subcordate at the base subdenticulate at the apex, upper ones confluent, rachis paleaceo-hirsute." *Bl. En. Fil. Jav. p.* 197. Blechnopsis? Javanica, *Pr. Epim. Bot. p.* 118.

Hab. Mountains of Java, *Blume.*—The author compares this with *Bl. occidentale*, which differs from it in the subsessile, wider, rather acute pinnæ, and glabrous rachis. He places it however next to *Bl. orientale*, and seems to consider it as belonging to the same group with that, viz. *Blechnopsis*, Pr.

19. Bl. *elongatum*, Pr.; "frond oblong pinnate, pinnæ ses-



sile elongato-linear acute entire cordate at the base plane beneath, veins thickish, sori terminating below the apex of the pinnæ, indusium reflexed." *Pr. Tent. Pterid. p.* 103 (*not Gaudichaud*).—Blechnopsis elongata, *Pr. Epim. Bot. p.* 117.

Hab. Manilla, *Meyen.*—"Affinis *Bl. orientali*, differt præcipue pinnis basi regulariter cordatis, indusio nigro-fusco, fasciculis venorum rachidis undecim."

20. Bl. *serrulatum*, Rich.; caudex thick rough suberect scaly, stipes a span to a foot long glossy terete but furrowed in front, pale-brown, frond oblong acuminate 1–3 feet long subcoriaceous firm glossy pinnated, pinnæ articulated on the rachis numerous linear-oblong sessile sometimes obtusely acuminated sharply serrated at the margin sessile obliquely subcuneate at the base rarely truncated often opposite, sterile pinnæ more approaching to elliptical and more distinctly serrated, veins close compact simple or rarely forked forming patent prominent lines on the under side, sori continuous extending from near the base to near the apex close to the costa or midrib.—"*Rich. in Act. Soc. Nat. Par.* i. *p.* 114." *Mich. Fl. Bor. Am.* ii. *p.* 264. *Sw. Syn. Fil. p.* 113. *Schkh. Fil.* 100. *t.* 108 (*very good*). *Willd. Sp. Pl.* v. *p.* 411. *Dict. des Sc. Nat. cum ic.* (*good, but reduced in size*). *Klotzsch in Linnæa*, xx. *p.* 350. *J. Sm. in Lond. Journ. Bot.* i. *p.* 198. *Mett. Fil. Hort. Bot. Lips. p.* 63. Bl. angustifolium, *Willd. Sp. Pl.* v. *p.* 414. Blechnum calophyllum, *Langsd. et Fisch. Fil. t.* 23 (*excellent*). *Willd. Sp. Pl.* v. *p.* 415. Blechnum stagninum, *Fil. Bras. p.* 54. *t.* 62. Blechnum angustatum, *Schrad. in Goett. Gel. Anz.* 1824, *p.* 87. 2 (*Presl*). Blechnopsis serrulata, *Pr. Epim. Bot. p.* 119.

Hab. "River Alsa-hatcha, Florida," *Michaux;* East Florida, *Mr. S. B. Buckley* (*in Herb. Nostr.*), the only locality known on the N. American continent. S. America: Dominica, *Dr. Imray*, n. 77. Trinidad, *Purdie, Cruger.* Guayaquil, *Hænke* (*fide Presl*). Isthmus of Panama, *Pendler*, n. 399. Abundant in British, French, and Dutch Guiana, *Richard and Robert Schomburgk* (n. 1436), *C. S. Parker, Rothery, Leprieur, Splitgerber, etc.* Province of Pará, *Spruce*, n. 35*, *and* n. 653; thence throughout Brazil, *Raddi, Martius, Gardner* (n. 183), *W. Lobb*, etc., to South Brazil, *Sellow*, to Porto Alegre, and Ilha Los Marinheiros, Rio Grande do Sul, *Mr. Fox.*—I am not so fortunate as to possess an authentic specimen of Michaux's first discovery of this plant in the southern states of N. America, Florida (doubtless its northern limits), but from the same State, and probably the same locality, Dr. Torrey has favoured me with a fine specimen, gathered by Mr. Buckley, and the species may thence be traced in greater or less abundance south to Rio Grande do Sul, in S. Brazil. It is also found at Guayaquil, on the authority of Presl. There is a wide space between these countries and New Holland and the Malayan Archipelago; yet these latter countries do afford a *Blechnum*, which has received other names, but which, with the utmost care, we have sought in vain to distinguish from the present, namely, the one next de-

scribed, the *Bl. striatum* of the accurate Brown. Presl considers that he has detected important distinguishing characters, and he speaks of an affinity (not clear to us) with *Bl. occidentale*,—but he never alludes to an alliance with *Bl. striatum*, when he says, "Specimina sterilia ob pinnas breviores latioresque a fertilibus paululum distincta" (which is sometimes the case, and in that particular approaches the Australian *Bl. ambiguum*). "Hocce dimorphismo et articulatione pinnarum cum rachi a congeneribus recedit." The same articulation of the pinnæ upon the rachis however exists in our present plant, and this character constitutes Presl's section "*Diafnia*" of his genus *Blechnopsis*.

21. Bl. *striatum*, Br.; caudex ascending thick rough knotted rooting and scaly, stipes a span to a foot long glossy semiterete brown-stramineous, black and scaly only at the base, fronds 1½–2 feet long oblong-lanceolate firm subcoriaceous shining pinnated, pinnæ articulated on the rachis all distinct sessile linear-elliptical remote often opposite obliquely cuneate or obtuse or even cordate at the base rarely obtusely subacuminated at the apex terminal one elongated the margins sharply serrated sterile ones with small brown scales on the costa, veins close compact mostly simple prominent beneath, sori close to the costa continuous. (Tab. CLIX.)—*Br. Prodr. p.* 152. *Desv. in Ann. Soc. Linn. Par.* vi. *p.* 284. *Spreng. Syst. Veget.* iv. *p.* 93 (*excl. syn. Labil.*). *Sieb. Fl. Mixta, n.* 725. *J. Sm. in Hook. Journ. Bot.* iii. *p.* 406. Bl. Moluccanum, *Desv. Berl. Mag.* v. *p.* 325. Blechnum stramineum, *Labil. Sertum Austro-Caledon. p.* 213. Blechnum squamulosum, *Kaulf. in Sieb. Fl. Mixta, n.* 242. Blechnopsis striata, *Pr. Epim. Bot. p.* 119. Blechnopsis Malaccensis, *Pr. Epim. Bot. p.* 120.

Hab. New Holland. Port Jackson, *Brown*, *Bauer*, *Sieber*. Near M'Adam's Range, and between Providence Hill and Point Pierce, Victoria, *F. Mueller*, 1855. Port Essington, N. Australia, *Armstrong*. Malacca, *Cuming*, *n.* 385; Mishmee, in marshes, *Griffith* (inscribed "*Blechnum pteridioides*"). Moist, open plains, Labuan, *Thos. Lobb*.—Were it not for the distinguished names which, as it were, warrant the conservation of this as a distinct species, I should have little hesitation in uniting it with the American *Bl. serrulatum*, our immediately preceding species. Certain it is that in the Old World this is found in widely diffused localities. There cannot be a question of the Malayan plant being identical with the Australian one. The fact, as I believe it to be, that the present plant is identical with, not even a variety of, *Bl. serrulatum*, renders it the more probable that my American *Bl. nitidum* is in reality the same as the Malayan *Bl. nitidum* of authors, and hence teaches us a lesson that widely separated localities are not indicative of specific distinctions.

22. Bl. *lævigatum*, Cav.; caudex thick ascending clothed with large lanceolate pale-ferruginous paleaceous scales, stipes ½ a foot to a foot long pale-brown subtetragonous scaly at the base, fronds 1–1½ foot long oblong-ovate trun-

cate at the base subcoriaceous or more or less membranaceous and subdiaphanous closely subpellucido-punctate pinnate, pinnæ 15–21 spreading sessile (not articulate) distant dentato-serrate truncate at the base, terminal one the largest obtuse, *sterile* pinnæ elliptical or oblongo-lanceolate and shortly and rather obtusely acuminate, *fertile* ones more distant linear subacute, veins rather distant simple or once or twice forked, sori broad costal, involucres broad arched often ragged, rachis very (deciduously?) paleaceous. (Tab. CLX.)—"*Cav. Demonstr.* 1801. *n.* 650." *Sw. Sp. Fil. p.* 115. *Willd. Sp. Pl.* v. *p.* 413. *Br. Prodr. p.* 152. "Lomaria scabra, *Kaulf. in Sieb. Syn. Fil. n.* 107, *and in Sieb. Fl. Mixt. n.* 273 (frons uno latere fertilis, altero sterilis)," *fide Presl.* Orthogramma lævigata, *Presl, Epim. Bot. p.* 121. Blechnum ambiguum, *Kaulf. n. sp. in Sieb. Syn. Fil. n.* 106 (*in Herb. Nostr.*). Parablechnum ambiguum, *Pr. Epim. Bot. p.* 109.

Hab. N.S. Wales, Port Jackson, *Brown, Sieber, Clowes.*—This is a very distinct species of *Blechnum*, and appears to be confined to one locality. That it is the *Bl. ambiguum* of Kaulfuss, MSS., in Syn. Fil. Sieb., is clear upon the authority of Sieber's own specimens; and, though I have not had the opportunity of seeing Mr. Brown's original specimen of his published *Bl. levigatum*, it is equally certain it is that species, notwithstanding that Presl places these in two different genera. The species is remarkable for the two forms of frond, the one with broad, sterile pinnæ, the other with narrow, fertile ones, and for the copious pellucid dots in both. Mr. Brown describes the pinnæ as "semidiaphanous;" they are sometimes remarkably so, but not unfrequently they are coriaceous and opaque, and the pellucid dots are then less distinctly visible. In the more perfect state of the plant the rachis is clothed with patent ferruginous scales, but these are often deciduous. Although our specimens are generally dimorphous, yet we possess intermediate grades showing a passage from the one to the other, and where the sori are on the broader pinnæ, they are more distant from the costa, and sometimes a receptacle, resembling a transverse vein, is distinctly formed, yet destitute of sori. One of our sterile fronds, only 10 inches long, has the terminal pinna 7 inches in length and 1¼ inch broad. The margins are everywhere a little thickened and subcartilaginous, and the veins are clubbed at the apex, terminating each within a tooth or serrature.

23. Bl. *australe*, L.; caudex thick subrepent copiously rooting, at the summit clothed with rather rigid glossy lanceolate scales, stipes 4–6 inches long, fronds 6 inches to 1–1½ foot uniform or nearly so pinnate, pinnæ rather distant subfalcate deeply hastato-cordate or even subsagittate at the base superior lobe or auricle generally the largest and most acute, *sterile* pinnæ oblong-lanceolate often obtuse and mucronate the margin rough dotted within the margin, *fertile* pinnæ (often confined to the superior part of the frond) linear-acuminate, sori near the costa continuous

rarely interrupted, involucres membranaceous brown.—Bl. australe, *Linn. Mant. p.* 130. *Thunb. Fl. Cap. p.* 734. *Sw. Syn. Fil. p.* 114. *Schkh. Fil. p.* 103. *t.* 110 *b. Willd. Sp. Pl.* v. *p.* 410. *Klfs. in Linnæa,* vi. *p.* 185. *Metten. Fil. Hort. Bot. Lips. p.* 63. *t.* 3. *f.* 7 (pinna). Lomaria australis, *Link, Fil. Hort. Berol.* 75. L. pumila, *Klfs. Enum. p.* 151. *Kze. in Linnæa,* x. *p.* 508. *Pappe and Rawe. En. Fil. Cap. p.* 29. Mesothema australe, *Pr. Epimel. Bot. p.* 111.

Hab. Throughout the Cape Colony, from about Cape Town to Macalisberg (*Sanderson*) and Natal, in the East. Island of St. Paul, Indian Ocean, lat. 38° 43′ 8 S., *M'Gillivray and Milne.* Bourbon (*Paris Mus. Nat. Hist. in Herb. Nostr.*). Tristan d'Acunha, *Carmichael,* and *M'Gillivray and Milne,* in Voy. of H.M.S. Herald.—It is not with entire satisfaction that I maintain the present species (*Bl. australe*) and the following (*Bl. hastatum*) as distinct. No doubt here, as in many other instances, the fact of a species long considered peculiar to the Cape had its influence on the author of the latter species, whose remarks under it are, "Varians species *Blechno australi* similis, tamen diversa: frondibus junioribus subtus ferrugineo-villosis, tandem subhirtis; auriculis multo majoribus, soris interruptis punctiformibus:"—all characters really of trifling moment, even if they were constant. One character, and one alone, for distinguishing the species, I find in the position of the sori, best seen however in the young state; in *Bl. australe* near the costa (but not so close as represented in Schkuhr's figure, l. c., letter *c.*); in *Bl. hastatum,* nearer the margin than the costa, as well represented by Kunze in his Suppl. to Schkuhr, l. c.; and yet I do not find that authors adopt this as a specific mark. Kaulfuss observes, "In *Blechno* (*fraxineo,* W.) *australi,* L., et *hastato,* Klfs., fructificationes a costa sunt remotæ, in reliquis autem costæ adproximatæ." The accurate Mettenius however says of both, "Sori inter costam et marginem medii." If this mark should fail, I do not see how the two species can be retained.

24. Bl. *hastatum,* Klfs.; caudex generally short thick rarely repent paleaceous, stipes 4–6 inches long, fronds 1–1½ foot nearly uniform lanceolate acuminate coriaceous pinnate, pinnæ more or less distant, younger ones pubescent, *sterile* ones oblong-lanceolate cordato-hastate subfalcate lowest ones subtriangular, *fertile* pinnæ narrower lanceolato-acuminate falcate mucronate with more distinct auricles at the base, sori between the costa and margin but nearer to the latter continuous or very frequently interrupted and then resembling those of *Doodia.*—Blechnum hastatum, *Klfs. En. Fil. p.* 161. *Kunze, in Linnæa,* ix. *p.* 60. *Hook. et Arn. Bot. of Beech. Voy. p.* 52. Lomaria hastata, *Kze. in Schkh. Fil. Suppl. p.* 110. *t.* 55. *f.* 1 (*excellent*). *Metten. Fil. Hort. Bot. Lips. p.* 63. *Philippi, Herb. Chil. n.* 213, 387 *et* 508. Blechnum trilobum, *Pr. Reliq. Hænk.* i. *p.* 50. *t.* 9. *f.* 2. *Hook. et Grev. Ic. Fil. t.* 192. Blechnum auriculatum, *Cav. Præl.* 1801? *Sw. Syn. Fil. p.* 114? *Willd. Sp. Pl.* v. *p.* 412? Lomaria blechnoides, *Bory, in Duperrey, Voy. p.*

273. *Colla, Pl. Chil.* ii. n. 139. *Kze. in Herb. Pæpp. et Herb. Nostr.*—Var. *minor*, pubescens. Blechnum pubescens, *Hook. Ic. Pl. t.* 97. Bl. remotum, *Pr. Tent. Pterid. p.* 103 (*name only*). Mesothema remotum, *Pr. Epimel. Bot. p.* 111. Lomaria pubescens, *Kze. in Schkuhr, Suppl.* i. *p.* 122. *t.* 55. *f.* 2.—Tænitis sagittifera, *Bory, in Duperrey, Voy. p.* 258. *t.* 30. *f.* 2. (a var. with pinnatifid pinnæ).

Hab. Chili, Concepcion to Valdivia, *Chamisso, Cuming*, n. 36 and 37, and 489 (2 feet long), *Lay and Collie, Pæppig, Philippi, Bridges, etc. etc.* Juan Fernandez, *Scouler, Bertero*, (and var. *pubescens*) *Douglas.* Peru, *Hænke* (*Presl*). Cordova, *Dr. Gillies.* Monte Video, *Capt. Philip King, R.N.* Uruguay, *Mr. Fox.* Buenos Ayres, *Gillies, Tweedie.*—(See our observations under the last species, *Bl. australe.*) The now greatly extended localities of these two species, and allowing for a little modification in the position of the sorus between the costa and the margin, may tend to confirm the view I have long entertained that the two are not permanently distinct. My own *Blechnum pubescens* I am very willing to sacrifice, and to consider a young state of the present, but the sori are certainly more marginal than the ordinary form of *Bl. hastatum.* Schlechtendal did not hesitate to unite the South American *Bl. auriculatum* of Cavanilles (from B. Ayres)—probably the same as our *hastatum*—with the African *Bl. australe.* The lobes at the base of our present species are extremely variable, as shown by Kunze, and that able botanist has, with equal accuracy, represented the continuous and the interrupted forms of the sori, so interrupted sometimes and with so much regularity as quite to resemble the fructifications of a *Doodia*, a peculiarity however which is common also to *Bl. australe.*

25. Bl. *rigidum*, Sw.; "fronds pinnate, pinnæ cordato-lanceolate obtuse superior ones confluent." *Sw. Syn. Fil. pp.* 114 *et* 314.—*Willd. Sp. Pl.* v. *p.* 410. Bl. Capense, *Burm. Prodr. Cap. p.* 28? Lomaria punctulata, *Drége, Pl. Cap. Exsic.* (*fide Presl*). Mesothema rigidum, *Pr. Epimel. Bot. p.* 113.

Hab. Cape of Good Hope, *Burmann?, Drége* (*Presl*).—This is scarcely known but by the brief diagnosis of Swartz, who says of it, "Differt a *Blechno australi*, L., quod frondes majores, rigidiores; pinnæ angustiores, obtusæ (nec submucronatæ), et terminales confluentes." Pappe and Rawson do not acknowledge the species in their Synops. Fil. Afr. Australis.—If Presl is right in referring Drége's *Lomaria punctulata* to the *Blechnum rigidum* of Swartz, these two must be united, for Drége's plant is correctly so named, at least in my specimens from Drége.

26. Bl. *ciliatum*, Pr.; "fronds elongato-lanceolate pinnate, pinnæ sessile horizontal ciliate auriculate on each side at the base, *sterile* ones oblongo-lanceolate mucronate, *fertile* ones linear acute, lowest ones opposite ovato-lanceolate, stipes and rachis pubescent and paleaceous." *Pr. Reliq. Hænk. p.* 50 (*not Mart. et Gal.?*).—*C. Gay, Fil. Chil.* vi. *p.* 478. *Sturm, En. Fil. Chil. p.* 23. Parablechnum ciliatum, *Pr. Epim. Bot. p.* 109.

Hab. Andes of Chili, *Hænke*, *C. Gay*.—"Habitus *B. australis*, si partem inferiorem frondis respicis. Superiore frondis fructiferæ parte ad *B. auriculatum* læve accedit.—Ab affini *B. hastato*, Klfs., multis notis differt."

27. Bl. *vittatum*, Brack.; "stipes smooth semiterete paleaceo-crinite, fronds membranaceous glabrous oblongo-lanceolate pinnate, pinnæ alternate, *sterile* ones linear-lanceolate attenuate serrulato-dilated at the base, *fertile* ones contracted lanceolato-linear acute dilated at the base, veins simple or forked parallel, sori approximate to the costa continuous, indusium cartilaginous entire." *Brack. Fil. U.S. Expl. Exped. p.* 131. *t.* 16.

Hab. Fiji Islands, in wet lands, *Brackenridge*.—I am unacquainted with any Fern exactly corresponding with the figure and description given by Mr. Brackenridge. The sterile fronds have broader pinnæ than the fertile one, and in the upper half they are more dilated at the base and subconfluent; in the sterile pinnæ the inferior pinnæ are remote, in the fertile all are remote, and in both the lower pinnæ are not at all dilated at the base. Fronds 1½–2 feet long, with a good deal the aspect of *Lomaria*, but the sori are those of *Blechnum*.

28. Bl. *arcuatum*, C. Gay; rhizome oblique and apparently increasing by underground runners clothed among the fasciculated stipites with subulate scales, stipes 1–5 inches long subterete furrowed in front, frond a span to 2 feet high 1–1½ inch broad rigid coriaceous opaque narrow-lanceolate pinnated, pinnæ numerous crowded but gradually diminishing below to small distant very abbreviated ones, the rest horizontal from a broad-cordate base obtusely auricled above and below ovato-lanceolate falcate obtuse or acute the margin quite entire thickened dotted with whitish points where the forked veins terminate just within the margin, veins immersed obsolete or only to be traced by a shrinking of the substance between them in some of the pinnæ, sori close to the costa continuous, involucres narrow-linear brown entire.—*Gay, Fl. Chil.* vi. *p.* 477. Bl. acuminatum, *Sturm, in Flora*, 1853, *p.* 362 (*not Fée*). *Metten. Fil. Lechl. p.* 13. *t.* 2. *ff.* 7–9 (*excellent*). *Sturm, En. Fil. Chil. p.* 22. Blechnum Bibræ, *Metten. in Lechl. Pl. Chil. n.* 127 *et* 508 *a*.

Hab. Chiloe, *Capt. Philip King* (*in Herb. Nostr.*). South Chili; Valdivia, from the coast to the elevation of 2000 feet on the Andes, *De Bibra, Philippi, Lechler, C. Gay*.—A very distinct species, and very uniform in its characters, first found, I believe, by Capt. Philip King, in Chiloe, whence I have one specimen measuring more than two feet in the length of its frond. This frond is always of a very narrow, almost linear-lanceolate form, of a firm coriaceous texture, singularly opaque (not translucent), so that the veins are quite obsolete; the upper surface is glossy, the margin thickened, and there is a row of white dots just within the margin, where the veinlets terminate.—One has a choice of three names for this species. *Bl. acuminatum* is the oldest published, but there

is a prior *acuminatum* of M. Fée. I think that of C. Gay is the one which should be retained.

29. Bl. *doodioides*, Hook.; caudex . . .?, frond 2 feet high 4 inches broad lanceolate coriaceo-membranaceous pinnate, pinnæ numerous subapproximate horizontal from a broad sessile and adnate base linear acuminate entire or very obscurely subsinuate slightly falcate opaque, upper half fertile with contracted pinnæ (narrow-linear), lower half sterile very much abbreviated towards the base, veins of the sterile pinnæ forked and quite free with small points where they terminate at the margin, the lowest vein of the forks in the fertile pinnæ sends out a vein which unites with the nearest veinlet transversely near but not close to the costa, on this chain of transverse veins the involucre has its origin and the space between this and the costa is eventually occupied by the sori which are continuous except while very young. (Tab. CLIII.)—*Hook. in Fl. Bor. Am.* ii. *p.* 263.

Hab. Interior of N.W. America (probably up Fraser's River), *Douglas*.—This is a very remarkable Fern, with quite the habit of *Blechnum*, and with the sori of *Blechnum*, and the sterile pinnæ have the venation of that genus, but the fertile pinnæ have an anastomosing vein connecting the fascicles of veins transversely, giving origin to the involucre and sorus. I have never seen other specimens than the two very perfect fronds from which the characters were drawn up in the 'Flora Boreali-Americana,' and I here transcribe the brief remarks. "Of this plant two specimens were sent to me by the late Dr. Gairdner (then resident at Fort Vancouver, on the Columbia), which were gathered in the interior by Mr. Douglas, but whether in the Hudson's Bay territories, or, as is possible, in North California, I am uncertain: I am disposed to believe, in the former country, because there is nothing of the kind in Mr. Douglas's Californian Herbarium. It seems a very distinct species, almost combining the characters of *Woodwardia* or *Doodia* with those of *Blechnum*. The veins are oblique with regard to the costa, forked, and not at all anastomosing in the sterile pinnæ; but when the fructification appears, the lower branch of a vein (or of a fascicle of veins) anastomoses with the vein of the next fascicle, and within that vein (next the costa) the sorus is formed. In the lower portion of the fertile pinnæ, the sori are frequently short and stand unconnected and more or less distant, as in *Woodwardia*, but generally they form a continuous line by the union of the adjacent sori. The stipes, as far as can be judged from my specimens, is short, and of a dark colour; the upper (fertile) pinnæ are very narrow, so that the sori there appear to occupy nearly the whole under surface, as in *Lomaria Spicant*, L.,"—from which the larger size of the fronds and the truly costal sori, at a considerable distance from the margin, on the unchanged frond, giving the Blechnoid character, would seem to distinguish it; nevertheless, seeing that *Lomaria Spicant* (or *Blechnum boreale*) is the only Lomarioid plant in so northern a latitude, and that the west coast of British Columbia exhibits a remarkable form of that plant (our γ *elongata*,—*Lomaria crenata*, Pr.), the present may possibly be a still more peculiar form of that species. Future specimens from British Columbia, now that British botanists are there, can alone settle the point.

Dubious Species of this Subsection (fronds pinnate), whose immediate affinities are unknown to us.

30. Bl. *validum*, Fée; "fronds lanceolate pinnate subolivaceous pinnatifid at the apex glabrous, stipes slender sulcate straw-colour with three fascicles of vessels, pinnæ lanceolate arcuate patulous acute sessile ultimate ones deflexed conform minutely serrulate at the margin cordate at the base, lower auricle large (*supra stipitem posita aperturam rotundam constante*), nervils distant pellucid at the apex, indusium thin coloured, sporangia small, annulus narrow with 18–20 articulations, spores ovoid." *Fée, Gen. Fil. p.* 74.

Hab. South America (*Herb. Mougeot.*).—"Ad *Bl. Brasiliense* accedens."

31. Bl. *helveolum*, Fée; "fronds very glabrous yellowish pinnate pinnatifid above acuminate, stipes slender pale-reddish scaly at the base, rhizome creeping throwing out many fibres, pinnæ lanceolate arcuato-acuminate ultimate ones deflexed, terminal one elongato-linear subcordiform at the base, the margin scabrous, nervils rather remote slender, sporothecia abbreviate situate in the middle of the pinnæ, indusium coloured, sporangia small, annulus of 14–16 articulations, spores subreniform." *Fée, Gen. Fil. p.* 75.

Hab. "Brazil, *Blanchet, n.* 2243. Caracas, *Moritz, n.* 17."

32. Bl. *acuminatum*, Fée; "fronds elongate pinnated glabrous lanceolate, stipes and rachis yellowish, pinnæ many narrow-lanceolate inferior ones deflexed much acuminated subcordate at the base sessile, intermediate ones connate, superior ones pinnatifid, margin scabrous, nervils pinnated very crowded, sporothecia neither attaining to the base nor the apex narrow, sporangia small, annulus narrow of 14–16 articulations, spores numerous subreniform." *Fée, Gen. Fil. p.* 75 (*not Sturm*).

Hab. Columbia, *Moritz.*

33. Bl. *impressum*, Fée; "fronds lanceolato-linear pinnate glabrous, stipes yellowish, pinnæ sessile horizontal firm opaque sublinear cordate at the base obtuse, nervils impressed fragile when dry, sporothecia extending from the apex to the margin brownish prominent, indusium thick coloured broadish persistent, sporangia ovoideo-oblique subauricled, spores minute ovoid." *Fée, Gen. Fil. p.* 75.

Hab. Columbia, *Linden, n.* 286.

34. Bl. *extensum*, Fée; "fronds narrow-lanceolate pinnate at the base pinnatifid above, stipes slender stramineous sulcated beneath paleaceous below multifibrillose, pinnæ lanceolate inferior ones remote obtusely mucronate scabrously serrated cordate, intermediate ones horizontal gibbous above, superior ones falcate, terminal one lanceolate conform, sporotheca thick, indusium narrow, sporangia small, annulus of 14–16 articulations, spores subreniform smooth." *Fée, Gen. Fil. p.* 75.

Hab. Brazil, *Claussen.*

35. Bl. *Atherstoni*, Pappe and Raw.; "frond pinnate coriaceous, pinnæ alternate rigid sessile subauriculate cordate linear-lanceolate acute and slightly waved at the margins, lower pinnæ remote." *Pappe et Raws. Syn. Fil. Afr. Austr. p.* 16.

Hab. South-west of Graham's-town, South Africa, *Dr. Atherstone*, 1856 "This species much resembles and stands close to *Bl. cartilagineum*, Sw." (but *Bl. cartilagineum* is not a pinnated species).

36. Bl. *auriculatum*, Cav.; "fronds pinnate auriculate on both sides at the base, fertile ones narrower." *Sw.—Cav. Præl.* 1801, *n.* 647. *Sw. Syn. Fil. p.* 114. *Willd. Sp. Pl.* v. *p.* 418. Mesothema auriculatum, *Presl, Epim. Bot. p.* 112.

Hab. Buenos Ayres (*Cavanilles*).—This seems to be unknown save from Cavanilles' brief description, and yet so accommodating are Presl's new genera in "Blechnaceæ" that it stands without any mark of doubt in his *Mesothema*. It is probably the *Bl. hastatum*, Klfs.

37. Bl. *denticulatum*, Sw.; "fronds linear-lanceolate pinnate, pinnæ ovato-lanceolate striated denticulate with an obtuse angle at the base above." *Sw. Syn. Fil. pp.* 113 *et* 311.

Hab. Teneriffe, *Vestenat.*—This species seems unknown at the present day, and no Fern corresponding with it is noticed by Webb in his valuable 'Phytographia Canariensis" as a native of Teneriffe. Presl, to whom it is also unknown, refers it to his *Blechnopsis.*

38. Bl. *appendiculatum*, Willd.; "fronds pinnate, pinnæ linear-lanceolate acute unequally dentate sessile auricled on each side at the base." *Willd. Sp. Pl.* v. *p.* 410. Mesothema appendiculata, *Pr. Epim. Bot. p.* 112.

Hab. Caracas, *Bredemeyer.*—A Fern apparently only known to Willdenow.

** *Fronds bipinnate.* (Salpichlæna.)

39. Bl. (Salpichlæna) *volubile*, Klfs.; caudex thick creeping bearing sparse rigid scales, stipites very long and twining over trees to a great height, frond bipinnate, pinnæ with

5–17 pinnules 6–12 inches long lanceolate or linear-lanceolate acuminate mostly quite entire coriaceous glossy obtuse and unequal at the base, veins simple or forked, combined by their apices with the callous thickened margin, sorus continuous close-pressed to the costa, involucre rigid membranaceous black at first involutely cylindrical at length patent and flat breaking up in pieces of various lengths and separating and falling away from the pinnules.—*Kaulf. Enum. Fil. p.* 159. *Kze. Anal. Pterid. p.* 20. *t.* 13. *Hook. Gen. Fil. t.* 93. Salpichlæna volubilis, *J. Sm. in Hook. Journ. Bot.* iv. *p.* 168. *Pr. Epimel. Bot. p.* 122. Blechnum scandens, *Bory, in Duperrey, Voy.* 272. *t.* 36. Salpichlæna scandens, *Presl, Epimel. Bot. p.* 122.

Hab. Tropical America, apparently abundant. Brazil, *Sellow*, *Blanchet*, *Gardner*, *n.* 185, 5306, *etc.* Guiana, *Le Prieur* (sterile pinnæ 2 inches broad), *Schomburgk*, *Kappler*. Peru, *Lechler*, *n.* 2542. Tarapota, Eastern Peru, *R. Spruce* (without No.), pinnules small, strongly serrated at the apex, sori very narrow. Columbia, *Purdie* (pinnules 15–16 inches long), *Moritz*, *Funck*, *n.* 776; *Fendler*, *n.* 117 (leaves almost elliptical, very abruptly acuminate). West Indies, Dominica, *Dr. Imray*, *n.* 53 (sterile pinnules 2¼ inches broad). Guadeloupe, *L'Herminier*. Trinidad, *Cruger*. Jamaica, *Purdie*.—This is on several accounts a very remarkable plant, and not the least peculiarity is its very close general resemblance to our *Lomaria volubilis* (p. 39, Tab. CL. of this vol.). The latter however has thin, almost membranaceous pinnules, always spinuloso-serrate at the apex, and somewhat cuneate and nearly equal at the base, dull and opaque on the surface, while the fertile pinnæ are narrow-linear, greatly longer than the sterile ones, and with the decided fructification of *Lomaria*, with marginal involucres. Both climb over trees and bushes to a height of 20 or 30 feet like a *Lygodium*. *Bl. volubile* has the true fructification of a *Blechnum* even in its early stage, the involucre originating close to the costa, at first so involute as to constitute a narrow black cylinder on each side the costa: this unrolls, and lies spreading quite flat upon the pinnule, and sometimes so broad as to occupy a considerable portion, even one-half, of the pagina. It then breaks into pieces of unequal length, separating entirely from the pinnule, and carrying away with them the crowded capsules, which are partially attached to the involucre. Mr. Purdie has recorded his observation that "when the sori and involucres have thus separated and fallen away so completely that no trace of them is left, those pinnules, much narrower (while fertile) than the sterile ones, now increase in size gradually, and become the sterile ones." Some of these are, I think, among the largest of any pinnules of Ferns I have seen. Hence, continues Mr. Purdie, it is, that the fructified pinnæ are always at the extremities, and in tall plants difficult to be procured. Such a plant may have some claims to generic distinction; but, if generally adopted, I could not accede to M. Fée's views of referring, as he has done, to the same genus, *Blechnum orientale*, *Bl. Finlaysonianum*, Wall., and even *Lomaria Patersoni*. If a genus at all, it must be limited to one species, from which the *Bl. scandens* of Bory (Salpichlæna scandens, *Pr.*) is in no way different.

N.B. The following species should be inserted at p. 52, after *Blechnum occidentale*, viz.:—

(*Veins anastomosing!*)

14*. Bl. *melanopus*, Hook.; caudex . . .?, frond spithameous (and more?) broadly falcato-lanceolate glossy subcoriaceous pinnate, pinnæ very approximate from a rather broad adnate base linear-oblong falcate somewhat acute the margin entire narrowly revolute uppermost ones gradually confluent into a lanceolate elongated lobe the lowest 3–4 pair suddenly diminished short very obtuse subauriculate at the superior base, veins internal reticulated! forming large angled areoles next the costa, narrower oblique ones often extending to the margin, ultimate veinlets free and clavate at their apex just within the margin, sori quite close to the costa continuous not reaching to the apex of the pinnæ, stipes (about a span long) and lower half of the rachis beneath black. (Tab. CLXI.)

Hab. Khasya Hills, Eastern Bengal, *Mr. Simons*, n. 78.—While this sheet is in type, I have the gratification to find, in a beautiful collection of Khasya Ferns, formed by Mr. Simons, in the collection of Mrs. Col. Lyell, this remarkable species. It is but a solitary specimen, destitute of caudex or root, but as a *Blechnum* it is unmistakably distinct. The first and most important character is the anastomosing of the veins, very much as in some *Litobrochiæ* among *Pteris*. In general outline and pinnated frond, its nearest affinity is doubtless with *Bl. occidentale*, but the pinnæ are more numerous, more approximated, indeed all of them very closely so, not only sessile but strictly adnate at the base, yet not at all decurrent; the three lowest pairs suddenly abbreviated and very obtuse, so that the two lowest pinnæ are semicircular, and not 2 lines long. The broadest part of the frond is below the middle, where the pinnæ are an inch and a half long, and these gradually diminish upwards into a lanceolate, acuminated terminal segment, little more than an inch long. The texture is peculiar, thicker than the fronds of other species of *Blechnum* in general, less pellucid, more coriaceous, yet glossy, and in the dry state (the only condition known to us) having the cuticle or epidermis, as it were, wrinkled and loosened from the parenchyma, particularly between the veins, very much as we see in the cuticle of the dried leaves of the Box. The sori and involucres are of the ordinary character, and placed quite close to the costa. The stipes is about equal in length to the frond in the specimen before us, quite black, yet not glossy or ebeneous; and the same colour on the under side extends about halfway up the rachis, and as far as the black colour extends, the surface is very minutely elevato-punctulate.

In our *Blechnum Fendleri* (p. 48, and Tab. CLVIII. Fig. 4), a true *Blechnum*, there is a disposition in the veins to anastomose, but there the free veins are evidently the normal character, whereas the reverse takes place here; the free veins are exceptional, and very much confined to the forked ultimate veinlets. Again, in the section *Salpichlæna*, there is a thickened margin of the pinnæ, with which the apices of the otherwise free transverse veins unite; but this again is quite different from the frequently anastomosing and reticulation of the veins of the present species.

3. SADLERIA, *Klfs.*

(FÉE, GEN. FIL. TAB. VII. A. FIG. 1, 2.) Blechni sp., *Gaudich.*, *Brack.* Woodwardiæ sp., *Metten.*

Sori linear, continuous on each side, parallel with and contiguous to the costa. *Involucre* narrow-linear, subcoriaceous, attached to the outside of an elevated receptacle which crosses the veins, opening towards the costa, at length patent. *Veins* sunk, obscure, simple or forked, combined so as to form a series of arches next the costa, the apices uniting with the thickened margin of the segments.—Caudex 2 *feet high, stout, arborescent.* Fronds *uniform, large, coriaceous, pinnate;* pinnæ *pinnatifid, segments opaque, the margins recurved, serrated.* Stipites *densely clothed with very long, narrow, sericeous, villose scales.*

I retain *Sadleria* as a genus rather on account of its peculiar habit or natural character than from any distinguishing mark derived from the fructification. The sori resemble those of *Blechnum*, but the involucre is more coriaceous and persistent. The composition and texture of the frond are very different; and judging from the very reduced figure of an entire plant in the Narrative of the Voy. of the U.S. Expl. Exped. iv. p. 231, the mode of growth is quite that of a Tree-fern.

1. S. *cyatheoides*, Klfs. En. Fil. p. 162. *Hook. et Arn. Bot. Beech. Voy. p.* 107. *Bory, in Duperrey, Voy. p.* 272. Blechnum Fontainesianum, *Bory, in Freyc. Voy. p.* 397. *t.* 15. *Brack. Fil. U.S. Expl. Exped. p.* 133. *Narrat. of Exped.* iv. *p.* 231 (*with woodcut, on a very reduced scale, of the entire plant*). Sadleria pallida, *Hook. et Arn. Bot. Beech. Voy. pp.* 75 *et* 107. *Presl, Epimel. Bot. p.* 121. Blechnum pallidum, *Brack. Fil. U.S. Expl. Exped. p.* 133. Bl. Kaulfussianum, "*Gaud. in. Voy. de la Bonite, Bot.*" Bl. Souleytianum, "*Gaud. Voy. de la Bonite, Bot. t.* 134?" Bl. squarrosum, "*Gaud. Voy. de la Bonite, t.* 78?" Bl. polystichoides, *Brack. Fil. U.S. Expl. Exped. p.* 135? ("cæspitose, stipites furrowed on one side paleaceous rough, fronds subcoriaceous glabrous bipinnate, pinnæ alternate sessile divaricated oblongo-lanceolate pinnated at the base lobato-crenate at the apex, pinnules triangulari-ovate obtuse revolute and crenate at the margin, rachis and costa densely paleaceous, veins immersed forked, indusium cartilaginous torn." *Brack.*) Woodwardia cyatheoides, *Metten. Fil. Hort. Bot. Lips. p.* 63.

Hab. Sandwich Islands, apparently very abundant, *Chamisso, Gaudichaud,*

Ley and Collie, Douglas, Diell, Seemann, etc. Communicated in a collection of plants from Sumatra, by *Mr. Teschemacher*, n. 17 (*Herb. Nostr.*). Presl gives the Society Islands, probably on the authority of our Flora of the Bot. of Capt. Beechey's Voy., where it is included among the plants *doubtfully* from Tahiti, accompanied by the remark that, "as some of the Sandwich Island plants in Capt. Beechey's collections were mixed with others from Tahiti, it was probable that our *Sadleria* was from the former place."—I must plead guilty to the making a bad species of the genus in our *Sadleria pallida*; it is clearly a trifling variety, and this fact, combined with the uniformity of the very many suites of specimens I have received from various collectors, induces me to think there is but one species. It is true I have no access to the 'Botany of the Bonite,' by Gaudichaud, where two new species are said to be figured (not described?), and I cannot express any opinion about them. Brackenridge remarks that his *Bl. polystichoides* differs from *Bl. cyatheoides* (and *Bl. pallidum*) "in the smaller size of the fronds, the shorter and broader pinnules, and the asperous and densely paleaceous reddish stipes and rachis." In other respects both the character and description sufficiently accord with the original type of the genus.

4. WOODWARDIA, *Sm.*

(HOOK. GEN. FIL. TAB. XVII.) Lorinseria and Anchistea, *Pr.* Blechnum, *L.*

Sori in a single series, oblong or oblong-linear, sunk in a cavity of the frond, parallel with and near the costa or costules. *Receptacles* on the transverse anastomosing veins which form a series of arches next the costa, and from which veins originate and are more or less anastomosing, sometimes very much so, even to the margin. *Involucres* almost coriaceous, usually persistent and opening like a lid above the cavity.—Caudex *or* rhizome *very long and thick, decumbent, scaly, copiously rooting.* Stipites *very paleaceous at the base with long subulate scales.* Fronds *pinnated or bipinnate with the pinnæ undivided or more or less deeply pinnatifid, not unfrequently proliferous from small scaly gemmæ on the upper side of the fronds.*—The species are more abundant in temperate or even cool climates than really tropical.

The present genus differs in many respects from *Blechnum*, with which it had formerly been incorporated, and is now almost universally adopted, but with various limitations; some retaining the species included by its author, Sir James Smith; some receiving into it *Doodia* of Brown; while others separate from it the *Woodwardia onocleoides* (as *Lorinseria*, Pr.) and the *W. Virginica* (*Anchistea*, Pr.). We are content to follow the views of Sir J. E. Smith, forming however three sections or subgenera.

§ EUWOODWARDIA.—*Fronds uniform (not of two kinds), pinate, pinnæ pinnatifid, veins reticulated near the costa and with at least one series of areoles outside the sori, those towards the margin free, or sometimes all anastomosing. Sori not extending to the main costa (of the pinnæ).*

1. W. *radicans*, Sm.; stipes elongate with large lanceolate

acuminate paleaceous scales at the base, fronds ample pinnate subcoriaceous, pinnæ distant often a foot or more long petiolate deeply pinnatifid broad-lanceolate acuminate, laciniæ ovato-lanceolate acuminate subfalcate spinuloso-serrate towards the apex, veins reticulate towards the main costa (of the pinnæ), a single series of areoles outside of the sori thence free to the margin, sori parallel with and near to the costule short oblong sunk in the cavity of the sorus which has an elevated margin, involucre vaulted coriaceous, rachis here and there producing large scaly germinating gemmæ at the base of some of the pinnæ.—*Smith, Act. Taur.* v. *p.* 412. *Schk. Fil. p.* 104. *t.* 112 (*venation very bad*). *Sw. Syn. Fil. p.* 117. *Hook. Gen. Fil. t.* 17. Blechnum radicans, *Linn. Mant. p.* 307. Woodwardia Stans, *Sw. Syn. Fil. p.* 117. *Schk. p.* 104. *t.* 113. W. auriculata, *Bl. En. Fil. Jav. p.* 196;—Var. *Americana*, not bearing gemmiferous buds. W. Chamissoi, *Brack. Fil. U. S. Expl. Exp. p.* 138. W. spinulosa, *Mart. et Galeot. Fil. Mex. p.* 64. W. radicans, *Liebm. Fil. Mex. p.* 87.

Hab. Madeira, *König* and numerous others. Canary Islands, not unfrequent. Spain, *Durieu* (*Herb. Nostr.*). Portugal, *Dr. E. W. Gray* (*Sm.*). Italy, near Ferrara, *Tille;* Ischia, Sorrento, *J. Woods*. Sicily, *Webb*. Northern India, towards and in the Himalaya Mountains, elevation of from 4–5000 feet, *Wallich* (*Cat. n.* 58), *Griffith, Hook. fil. and Thomson, Edgeworth, Col. Bates, Strachey and Winterbottom*. Java, *Kuhl and Van Hasselt* (*fide Blume*), *Thos. Lobb;* veins all free between the sori and the margin. Var. *Americana:* Mexico, Sierra Madre, *Seemann;* Huatuco, *Liebmann; Lay and Collie* (Pacific coast); Pine forests, Chiapas, *Linden*. Guatemala, *Skinner*. California, *Chamisso, Sinclair, Lay and Collie, Dr. Coulter, n.* 825, *Brackenridge*.—This is a widely dispersed species, yet in one sense limited in its localities. The accurate Mettenius gives (Fil. Hort. Bot. Lips. p. 66) "America borealis" as the locality; but in the ordinary sense of that term, as comprising the United States and Canada, we find no record of its existence there. It makes its appearance in California, extends southward to Mexico and Guatemala, and is not known anywhere else in the New World.* In the Old World we possess it from the northern African islands above mentioned, from Spain and Portugal, Sicily, and probably from nowhere more abundant than from the eastern range of the Himalaya Mountains, from Simla in the west to Bhotan in the east. In Java beautiful specimens were gathered by Mr. Thos. Lobb, and these differ from the more northern plant in their darker colour when dry, and in the less reticulated or anastomosing venation, and in nothing else. It is doubtless the *W. auriculata*, Bl.—The species is a fine and very beautiful one, and often bears large scaly bulbs or gemmæ (forming new plants) on the rachis at the base of the pinnæ, in size and situation quite different from those produced by the following species.

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* Brackenridge indeed considers the Californian plant distinct, having "an erect frond and pale-coloured veins." There is nothing in our numerous specimens to lead to this conclusion; but I may observe that the Mexican plant is said by Schaffner to be destitute of bulbillæ.

2. W. *orientalis*, Sw.; stipes elongated, clothed at the base with very large membranaceous lanceolato-acuminated scales 1–1½ inch long, fronds ample coriaceous pinnated, pinnæ scarcely petiolated ovato-lanceolate acuminated 6 in. to a foot long and obliquely cuneate at the base deeply pinnatifid, segments lanceolato-acuminated cartilagineo-serrated above, the longest are at the superior base (3–5 inches long rarely again pinnatifid) those at the inferior base dwarfed or suppressed, veins generally everywhere anastomosing with rather small areolæ, involucre vaulted coriaceous margin of the cavity of the sorus elevated, gemmiferous buds frequent small scaly on the upper pagina of the pinnæ from a point corresponding with the sorus beneath.—*Sw. Syn. Fil. pp.* 117, 315. *Willd. Sp. Pl.* v. *p.* 418. *Kze. Pterid. Jap. in Bot. Zeit.* 1818, *p.* 323. Blechnum Japonicum, "*Houttuyn Natuurlijke Hist.* ii. *t.* 97. *f.* 1." Woodwardia Japonica, *Hook. Kew Gard. Misc.* ix. *p.* 341, *in part* (*not Sw.*). Woodwardia prolifera, *Hook. et Arn. Bot. of Beech. Voy. p.* 275. *f.* 56 (*not* 57 *as in text*); small specimens unusually proliferous. W. radicans, *D. C. Eaton, in List of Williams and Morrow's Japan Ferns, p.* 329.

Hab. Japan, *Thunberg, Goring, Williams and Morrow.* Loochoo Islands, *Lay and Collie* (small and copiously proliferous.) *Wright, in Herb. of Ringgold and Rodgers's U.S. N. Pacif. Expl. Exped.*, has two forms: (1) the ordinary form, large, coriaceous, not proliferous; and (2) thinner and almost membranaceous, very proliferous (as in Lay and Collie's specimens), pinnæ finely acuminated, differing however from our other specimens of *W. orientalis* in the veins being free towards the margin of the pinnules, as in *W. radicans*). Keelung, Island of Formosa, *Wilford* (June, 1858); fronds very fine, 3–4 feet long, often proliferous, veins much anastomosing.—With a general aspect in this Fern closely resembling that of *W. radicans*, and which would almost seem to justify Mr. Eaton in considering it the same, there are differences which I think will suffice to keep it distinct. It was correctly observed by Swartz, "Laciniæ reticulatim venosæ." This is very conspicuous to the naked eye; but I fear even this, so often used as a generic character, will not hold good here as a specific distinction. One of Mr. Wright's Loochoo specimens has the venation of *W. radicans*, but its gemmiferous condition is that of *W. orientalis*, and so is the shape of the pinnæ that of *W. orientalis*: that is, the two sides are very unequal at the base, the superior base having invariably the longest laciniæ of any on the pinnæ, whilst on the inferior base they are as invariably the shortest. Swartz contrasts it in the first instance with *W. Japonica*, and says of it, "Stipite nudo, pinnis petiolatis nec sessilibus." and I must confess that when I had only imperfect specimens of *W. Japonica* and *W. orientalis*, I was led to unite the two: yet the affinity of the latter is clearly with *W. radicans*.

§§ ANCHISTEA, *Pr.*—*Fronds uniform, pinnate, pinnæ pinnatifid, veins all free between the sori and the margin, as in* Doodia.

3. W. *Virginica*, Sm.; rhizome creeping subterranean,

stipes very long naked, fronds 12–18 inches long erect broad-lanceolate pinnate, pinnæ numerous sessile lanceolate scarcely acuminate 5–6 inches long deeply pinnatifid, segments ovato-oblong obtuse entire or slightly serrulate, veins free between the sori and the margin, sori copious approximate forming continuous lines close to the costa of the pinnæ and the costules of the segments, involucres submembranaceous, cavity of the sori indistinct the edge very slightly elevated.—*Sm. Act. Taur.* v. *p.* 412. *Willd. Enum. p.* 1075. *Sw. Syn. Fil. p.* 117. *Metten. Fil. Hort. Lips. p.* 66. *t.* 6. *f.* 1, 2 (*excellent*). *Gray, Man. of Bot. N. U. St. p.* 593. *t.* 10. *ff.* 4, 5 (*fertile pinnæ and venation, very accurate*). W. Bannisteriana, *Mich. Fil. Bor. Am.* ii. *p.* 263. *Sw. Syn. Fil. p.* 117. Blechnum Virginicum, *Linn. Mant. p.* 307. Blechnum Carolinianum, *Walt. Fl. Carol. p.* 257. Woodwardia thelypteroides, *Ph. Am.* ii. *p.* 670 (frond smaller, more thin and membranaceous). Doodia Virginica, *Pr. Tent. Pterid. p.* 99. Anchistea Virginica, *Pr. Epimel. Bot. p.* 71.

Hab. Swamps, Vermont and New York, to Virginia and southwards, *Michaux, Pursh, Torrey, Asa Gray, etc.*—Pursh's original specimens of his *Woodwardia thelypteroides* being in my herbarium, I can with confidence say the plant is only a weak state of *W. Virginica*. The species is a very distinct one, and its affinity rather with *W. Japonica* than any other. The root of this seems to creep extensively underground, probably after the manner of *Pteris aquilina*. The stipes, even at the base, is in our specimens destitute of scales.

4. W. *Japonica*, Sw.; stipes with long ferruginous scales at the base, frond a span to 1½ foot long erect broad-ovate subcoriaceous pinnate, pinnæ lanceolate acuminate serrated at their extremity sessile lobato-pinnatifid at the margin, superior base truncate inferior rounded, lobes short broad ovate sparsely serrate obtuse or acute, veins free towards the margin, sori few oblong approximate forming two close-placed lines upon the costules commencing near the costule of the pinnæ and terminating some distance from the apex of the lobe, involucres vaulted subcoriaceous, stipes and rachis often paleacous with deciduous scales.—*Sw. Syn. Fil. p.* 116. "*Spreng. Anleit. z. K. der Gew.* 1. *Ausg.* 3. *pp.* 119, 120. *t.* 4. *f.* 29." *Willd. Sp. Pl.* v. *p.* 445. *Hook. in Kew Gard. Misc.* ix. *p.* 341 (*in part*). *Kze. Pteridogr. Jap. in Bot. Zeit.* 1818, *p.* 322. *D. C. Eaton in List of Williams and Morrow's Japan Ferns, p.* 329. Blechnum Japonicum, *Linn. Suppl. Syst. p.* 447. *Thunb. Fl. Jap. p.* 333. *t.* 35 (*good*).

Hab. Japan, *Thunberg, Goring, Mertens.* China, near Sunglong, *Harland,*

Sunglong Bay and Chusan, *Alexander*.—This species is well distinguished by the small size, sessile pinnæ, and comparatively very shallow lobes. In the two previous species the pinnæ are so deeply pinnatifid that the lines of sori are quite included in them; here a very different aspect is given by the sori often stopping short of the lobes, and appearing to belong to the disc of the pinnæ (almost at right-angles with the costa) rather than to the lobes. All my specimens turn brown in drying, and both the fronds and involucres are more membranaceous than in the preceding species.

§§§ Lorinseria, *Pr.—Fronds dimorphous, fertile ones more or less contracted, in both pinnate or pinnatifid, pinnæ entire or scarcely lobed, veins everywhere copiously reticulated.*

5. W. *areolata*, Moore; caudex rather stout creeping and as well as the base of the elongated stipes paleaceous, fronds dimorphous a span to a foot long, *sterile ones* subtriangular-ovate membranaceous deeply pinnatifid (pinnate below), segments 16–25 lanceolate horizontally patent acute or obtuse finely serrated entire or sinuato-sublobate, lowest ones or pinnæ petiolate, veins everywhere anastomosing, *fertile fronds* ovato-lanceolate coriaceous pinnate, pinnæ remote linear, sori approximate occupying nearly the whole under side of the pinnæ between the costa and margin.—*Moore, Index Fil. p.* xiv. Acrostichum areolatum, *Linn. Sp. Pl. p.* 1526. *Gron. Virg. p.* 124. *Amœn. Acad.* i. *p.* 274. Woodwardia angustifolia, *Sm. Act. Taur.* v. *p.* 411. *Sw. Syn. Fil. p.* 116. *Gray, Man. of Bot. N. U. States, p.* 593. *t.* 10. *f.* 1, 23 (*excellent*). *Metten. Fil. Hort. Bot. Lips. p.* 66. *t.* 6. *f.* 67. W. onocleoides, *Willd. Sp. Pl.* v. *p.* 416. Onoclea nodulosa, *Mich. Fl. Bor. Am.* ii. *p.* 272. *Sw. Syn. Fil. p.* 111. Woodwardia Floridana, *Schk. Fil. p.* 103. *t.* 111. Lorinseria areolata, *Pr. Epim. Bot. p.* 72. *Fée, Gen. p.* 207. *t.* 17 *B.*

Hab. Bogs, Massachusetts, near the coast, to Virginia and southward (*A. Gray*), *Gronovius, Michaux, Pursh, T. Drummond, Chapman, and all American botanists*; apparently most abundant in the Southern States.—This has so much of the aspect of *Woodwardia*, that I cannot but think it better to retain it as a section of that than as a distinct genus: and I think that my next species, *W. Harlandii*, naturally ranks in the same group, as to general structure and venation, although the dimorphous character of the fronds is not quite so apparent.

6. W. *Harlandii*, Hook.; caudex creeping scaly as is the base of the elongated stipes, fronds subdimorphous simple or tripartite generally deeply pinnated or the two lowest segments free broad-ovate in circumscription subcoriaceous, segments 3–7 inches often a span long an inch to 1½ inch broad, terminal one more elongated, those of the *sterile frond* broad oblong-lanceolate those of the *fertile frond* linear oblong or lanceo-

late entire or rarely obscurely lobed serrulate only at the acuminated apex, veins everywhere copiously anastomosing, sori oblong numerous approximated eventually confluent forming a continued series or chain close to the costa on each side and frequently in the slightly-lobed specimens at certain distances sending out nearly opposite pairs of sori even where there is no distinct costule (so that the segments present to the eye a pinnatifid line of fructifications from the base to the apex), involucre vaulted but submembranaceous, cavity of the sori indistinct.—*Hook. Fil. Exot. t. 7, and in Florula (Ferns) of Hongkong, Kew Gard. Misc.* ix. *p.* 341.

Hab. Hongkong, among long grass and low bushes, *Harland, Lorraine, Wilford*, n. 15. A very remarkable and very beautiful *Woodwardia*, fully described and figured in the 'Filices Exoticæ' above quoted. It was first received from the lamented Dr. Harland, a gentleman who, had he lived, would have done much for the promotion of the Botany of China and Japan.

[Woodwardia *dispar*, Willd. Sp. Pl. v. p. 419, is a name given to an imperfectly known Fern of Martinique, figured by Plumier, Fil. t. 16.]

5. Doodia, *Br.*

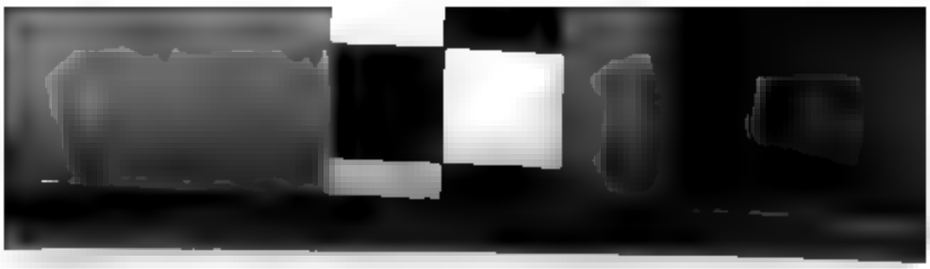
(Hook. Gen. Fil. tab. XXIV. A.) Woodwardia, *Metten.*

Sori oblong or sublunulate, in one or more series, arranged transversely, with the veins forming areoles which are superficial, not sunk. *Involucres* membranaceous, of the same form as the sori, opening towards the costa and lying parallel with it. *Veins* prominent beneath, free, except where they anastomose for the production of sori, simple or forked.—Caudex *a subglobose, small rhizome, rarely erect subcaulescent.* Fronds *sometimes subdimorphous, fascicled, rather membranaceous than coriaceous, subasperous, erect, small, a span to* 1–2 *feet, lanceolate, pinnate or pinnatifid;* segments *or* pinnæ *sharply serrated. Natives of the southern hemisphere, especially in Australasia and the South Pacific islands: one species is found in Java and Ceylon: none is indigenous to the new world.*

Restricted as the genus was by Mr. Brown, this appears to me a good one, with a natural habit and tangible characters, as well defined as those of most genera of Ferns. "Admodum affinis," says Presl, "est *Doodia Woodwardiæ;* non differt nisi venis venulisque subtus elevatis, soris a costa remotiusculis, non immersis nec linearibus, indusio plano nec fornicato." Presl however includes the *Woodwardia Virginica*, Sw., et Nobis, in which view I do not coincide.

(*Pinnatifid.*)

1. D. *aspera*, Br.; caudex short subrepent rooting with black wiry fibres, fronds uniform a span to a foot and more



long including the short black subsquamose scabrous stipes fascicled erect lanceolate acuminate attenuate at the base rigid asperous with spicules deeply almost to the rachis pinnatifid, segments numerous nearly horizontal subfalcate 1½ to 2½ inches long lanceolate lowest ones abbreviated more or less free subtriangular with a broad adnate base, all spinuloso-denticulate, sori small in one or two rows distant from the costa, involucres very small evanescent.—*Brown, Prodr. p.* 151. *Spreng. Neue Entd.* i. *p.* 234. *t.* 3. *f.* 1. *Hook. Exot. Flora, t.* 8. (*small cultivated plant*). *All. Cunn. Bot. N. Zeal. Hook. Comp. Bot. Mag.* ii. p. 364. Woodwardia aspera, *Metten. Fil. Hort. Lips. p.* 65.

Hab. New Holland; Port Jackson, *Brown, Allan Cunningham, Bynoe, Sinclair, Clowes*, etc. Brisbane River, and head of the Burnett River, N. Australia, *F. Mueller;* one specimen 1½ foot high, growing with plants of the ordinary size. Port Essington, *Armstrong;* New Zealand ?, *D'Urville, Allan and R. Cunningham, Brackenridge.* – It is not a little remarkable that our herbarium, though eminently rich in New Zealand plants (including Dr. Hooker's collections formed there), does not possess a single specimen of *Doodia aspera* from that country; and I am hence led to believe that all writers on the Botany of New Zealand have mistaken a state of *D. media* for it. Dr. Hooker indeed has himself been disposed to unite this species with *D. caudata*, in his 'Flora Novæ-Zelandiæ.' It is however quite a distinct species, of a peculiarly firm, straight, and rigid character, with fronds singularly contracted at the base, so that the greater portion of the stipes is lobato-alate rather than pinnatifid, and if two or three of the lower lobes are free from union with the adjacent ones, they are broadly adnate, not in the least contracted at their base.

We will not venture, from the brief character given by Desvaux (Mém. Soc. Linn. de Paris, vi. p. 285) of his *Doodia blechnoides*, to say what it is: but if a *Doodia*, there is no doubt an error in giving it as a native of "S. America."

2. D. *blechnoides*, A. Cunn.; "fronds pinnatifid, segments linear-ensiform much attenuated mucronato-serrulate dilated at the base, lowest ones abbreviated lanceolate or semi-orbicular distinct, stipes nearly terete scabrous at the base."—*All. Cunn. note in Bot. of N. Zeal. in Hook. Comp. to Bot. Mag.* ii. *p.* 365 (*not Desv.*). Woodwardia blechnoides, *Mett.* (*not Desv.*) "rhizome repent oblique shortly stipitate, stipes with scattered black paleaceous scales, fronds conform 1–1½ foot long membranaceous rigid scaberulous glabrous broad-lanceolate from the middle towards the base and towards the apex gradually decreasing pinnatisect, segments multijugate contiguous and confluent with a narrow wing, lowest ones subremote abbreviated transverse or oblong, superior (or middle) ones 2 inches long 4 lines wide equally dilated at the base elongato-oblong gradually attenuated and acuminated the margin subundulated serrated with callose subspinulose

teeth, areoles in a single series as in *Doodia*, sori uniseriate distinct appressed to the costa, indusium plane close to the costa rigidly membranaceous." *Metten. Hort. Fil. Lips. p.* 65. *t.* 6, 3, 4 (*excellent*).—Doodia maxima, *J. Sm. Bot. Mag. Misc.* 27.

Hab. New South Wales; ravines on the banks of the Nepean and on the Warra-burrha River, 1825, *C. Fraser*, *A. Cunningham*.— In a note of Allan Cunningham's to the species of *Doodia* enumerated by him in the Comp. to the Bot. Mag., l.c., he characterizes a new Australian species of the genus, collected by Frazer and himself in 1825, under the name of *D. blechnoides*, so named, probably, though he does not notice the fact, from the unusually close proximity of the lines of fructification to the costa. Mr. J. Smith possesses, from Cunningham himself, a specimen under this name, and I have one from Fraser, both corresponding, and both sufficiently according with Allan Cunningham's brief character, except that our specimens are destitute of the lower abbreviated pinnules, the presence of which would ally the species to *D. aspera*. From seeds or spores of his specimen Mr. Smith assures me he has raised a very fine *Doodia*, with an erect arborescent caudex a foot high and an inch thick, bearing a crown of fronds 2 feet long (including the short stipes), and this is the origin of the *D. blechnoides* of our gardens, and of which an excellent figure of a frond and fructified portion magnified are given by Mettenius, l.c., perfectly according with the living plant of Kew, with specimens taken from it in former years in Mr. Smith's herbarium, and also with other specimens thus taken from the plants in the late Messrs. Loddiges' garden. These have the singularly abbreviated basal lobes as described by Cunningham (and quite resembling those of *D. aspera*), but the segments are much broader than those described by Cunningham, and much more approximate and less decurrent below than our native specimens: all however have sori close to the costa and always uniseriate, which is perhaps the most important feature of the plant; they give a more Woodwardioid character to it: and, when dry, our native specimens partake more of that yellowish-brown colour common to *Woodwardia* as seen in the herbarium.

It must be observed that Mettenius describes the caudex or rhizome as "repent and oblique." Perhaps his plant was young, and the caudex not fully developed. Ours has, for any one of this genus, though small, yet quite an arborescent character of stem.

3. D. *dives*, Kze.; "frond coriaceous glabrous obsoletely veined ovato-oblong acuminate, at the base remotely, towards the apex more densely, decursivo-pinnate at length confluent, pinnæ patently divergent oblong, costa prominulent beneath, on each side especially above pungently serrated, inferior ones shortly petiolate auriculate subattenuate rotundately obtuse at the apex mucronate the middle and superior ones adnate or on each side (*imprimis deorsum*) broadly decurrent sublinear falcate much attenuated obtuse the supreme ones at the elongated apex of the frond subsinuato-confluent, sori subbiseriate lunate at length confluent, indusia herbaceous, petioles rachis and moderately long and angled stipes ebeneous, at the base of the stipes blackish-paleaceous, rhizome obliquely ascending black-paleaceous radicose clothed with

black fibres." *Kze. in Schk. Fil. Suppl.* ii. *p.* 12. *t.* 105, *and in Fil. Zolling. Bot. Zeit.* 1848, *S.* 144.—Woodwardia dives, *Metten. Fil. Hort. Lips. p.* 66.—*β. Zeylanicum*; stipes and rachis and paleaceous scales brown, frond long-caudate at the apex, segments of the fertile frond very distant linear-oblong alato-decurrent.

Hab. Java, *Zollinger.*—*β.* Ceylon, *Mrs. Gen. Walker, Gardner*, n. 1806.—I am not so fortunate as to possess Java specimens of this plant, but I have copious specimens of a *Doodia* from Ceylon, of which the sterile frond exactly corresponds with the figure of Kunze above quoted, and one or two of the fertile sufficiently accord with the figure of that state of the plant; but the majority of the latter have the segments often nearly an inch apart, and not cuneately decurrent, but suddenly, so as to form a broad wing-like expansion to the rachis, except the lowest ones, which are always free, and either lobed at the base above, or on both sides so as to be hastate. The wings of the rachis bear sori as well as the segments and pinnæ.—As a species, this has a close affinity with the larger state of *D. media* of Brown and this work, but the present is more truly pinnatifid, two or three of the lowest pairs only being free and more or less petiolate, and these not at all decurrent. In all my specimens the sori are in two series.

(*Pinnate: pinnatifid above.*)

4. D. *media*, Br.; caudex short stout ascending clothed with black subulate scales as is the black base of the smooth stipes which is 3–5 inches long, fronds rigid tufted a span to a foot long nearly uniform more or less lanceolate pinnatifid in the upper half (or less) the rest pinnate, segments and pinnæ approximate spinuloso-dentate very patent, the former from a broad and sometimes decurrent base linear-oblong attenuated generally obtuse, terminal one mostly elongated subcordate, pinnæ of the same shape as the segments but the lowest ones are the most distant and more or less auricled at the base above, rachis smooth, sori in one series.—*Br. Prod. Nov. Holl. p.* 151. D. Kunthiana, *Gaud. in Freyc. Voy. Bot. p.* 401. *t.* 14. Woodwardia lunulata, *Metten. Fil. Hort. Bot. Lips. p.* 66 (*who quotes* Doodia lunulata, *Br. Prodr. p.* 7. *ed. Germ.*).

Hab. Australia, Tropical New Holland, *Banks, in Br. Prodr.* Endeavour River, *All. Cunningham*; shady places, Port Jackson, *Fraser*, n. 285; Snowy River, Australian Alps, *F. Mueller.* Norfolk Island, *Allan Cunningham, M'William* (one specimen passing into *D. connexa*, Kze.), *Simmons, Milne.* New Zealand, Northern Island, *Fraser, Logan, Allan Cunningham, Colenso, J. D. Hooker* (smaller more caudate, approaching *D caudata*, but very rigid). Oahu, *Beechey, Douglas, Seemann*, n. 2237. S. S. Isles, *Bennett.* Ovolau, Fiji Islands, *Milne.*—Without having been privileged to see an authentic specimen of Mr. Brown's *D. media*, I have selected a *Doodia* which I know Mr. Allan Cunningham considered should bear that name, and which I believe to be identical with the *D. Kunthiana* of Gaudichaud, and certainly specimens from the locality of Gaudichaud's plant,

Oahu, quite accord with those from N. Holland and other islands of the South Seas.

5. D. *connexa*, Kze.; "frond linear-lanceolate acuminate subcoriaceous glabrous pinnated pinnatifid towards the apex, pinnæ sessile remote alternate patulous linear-oblong obtuse serrulate decurrent" (more or less), "the sinuses broad subangulate, inferior ones auriculate, stipes and rachis purple-black glabrous." *Kze. in Schk. Fil. Suppl.* i. *p.* 11. *t.* 6.—D. Kunthiana, *Hook. et Arn. Bot. of Beech. Voy. p.* 74, *and Gaud.?*

Hab. Pitcairn's Island, *Cuming*, *n.* 1371 (the authority for the species); frond larger than Dr. Kunze's figure, 2 feet long independent of stipes, and 6 inches wide; *Mathews*, and Otaheite, *Cuming*, *n.* 1413 (these quite correspond with Kunze's figure). Coral Isles, *Beechey*, the same form as Cuming's 1374. Raoul, or Sunday Island, *Milne and M'Gillivray:* the same state as that last mentioned; but some of Milne's specimens are very luxuriant, and have segments and pinnæ 6 inches long, sometimes, but rarely, partially pinnatifid. In this the sori are in two rows.—The majority of my specimens are larger than the specimen which is figured by Kunze, which last is, I fear, not different from our *D. media;* and I fear, too, our largest specimens should be referred to that species. All our species of the genus are singularly variable.

6. D. *caudata*, Br.; roots wiry black villous with black hairs, no distinct caudex, stipes slender 1–4 inches long smooth or nearly so stramineous-black at the base, fronds tufted subdimorphous 5–10 inches long flexuose generally thin membranaceous pale-green oblong- or linear-lanceolate pinnate nearly to the summit, *sterile* generally the shortest, pinnæ elliptical membranaceous obtuse more or less acutely and subpungently serrate approximate uppermost ones only confluent into an oblong-lanceolate apex, *fertile* ones longer narrower more harsh and rigid, pinnæ remote linear or linear-attenuate truncate and subauricled at the base sometimes the margin acutely and pungently dentate, inferior ones more distant and sterile, uppermost ones only confluent and terminating in a very long caudate segment, sori in a single series, involucres membranaceous, rachis stramineous slender quite smooth.—*Br. Prodr. p.* 151. *Hook. Ex. Fl. t.* 25 (*small, but very correct*). *Hook. fil. Fl. N. Zeal.* ii. *p.* 37? (*excl. syn.* D. aspera *et* D. Kunthiana). Woodwardia caudata, "*Cav. Demonstr.* 1801, *n.* 653." *Sw. Syn. Fil. p.* 116. *Willd. Sp. Pl.* v. *p.* 417. *Metten. Fil. Hort. Lips. p.* 67. Doodia rupestris, *Kaulf. in Sieb. Fl. Mixta, n.* 248, *and in Syn. Fil. n.* 114.

Hab. Van Diemen's Land and New South Wales, *Brown.* Argyle County, *A.*

Cunningham. S. Australia, Victoria, *Robertson*, and Doodenong ranges, *F. Mueller* Subtropical New Holland, *Col. Mitchell*, n. 330. Brisbane River, *A. Cunningham*, New Zealand, N. Island, *Colenso*, *A. Cunningham*, *J. D. Hooker*; and Houraki Gulf, *Lyall*; all these from N. Zealand border too closely upon *D. media*, the fronds are more rigid, scarcely dimorphous, the pinnules broader and more spinuloso-serrate.—This species has fronds which are the most thin and delicate and flaccid of any of the genus; but the fertile fronds, besides having much longer and narrower pinnæ than the sterile, are more harsh and rigid, and the teeth or serratures more spinulose. Nevertheless there are specimens which almost unite the present with *D. media*, Br. In this however it is only the apex that is pinnatifid, the rest of the frond is pinnate with numerous pinnæ, the lowest ones the most apart.

Subord. VI.—ASPLENIEÆ.

Sori dorsal, generally distant from the margin, scattered, linear or oblong, oblique with regard to the costa, rarely subparallel with it. *Involucres* arising from the side of a vein or veinlet, sometimes from the superior or inferior side, sometimes two thus situated on the same vein (then diplazioid), opening towards the costa, plane or vaulted (very convex), generally membranaceous.—*Tufted* Ferns, *or furnished with a more or less elongated* caudex *or* rhizome; *abounding in warm and tropical regions, though by no means confined to them.* Fronds *extremely various in form and texture.* Veins *simple or forked, or pinnated, free or variously united, and anastomosing.*

This is a tribe or suborder including very numerous species, and, according to the views of some authors, a considerable amount of genera. Such as entertain this latter opinion, in the main, trust to the different nature of the venation: and with us the majority of such genera are incorporated in one great genus.

1. Asplenium, *L.*

(Hook. Gen. Fil. t. XXX. (Euasplen.). Tab. CXIII. B. (Thamnopteris, *Pr.* Neottopteris, *J. Sm.*) Tab. VI. (Cænopteris, *Berg.* Darea, *Juss.*) Tab. XVI. (Athyrium, *Pr.* Allantodia, *in part., Br.*) Tab. CXIII. A. (Ceterach, *Willd.*) Tab. LV. A. (Hemidictyum, *Pr.*) Tab. LV. B. and LVI. B. (Diplazium, *Pr.* Diplazii sp. *Sw. et alior.*) Tab. LVI. A. (Anisogonium, *Pr.*) Tab. LVI. C. (Digrammaria, *Pr.*) Tab. CXVI. (Oxygonium, *Pr.*) Callipteris, *J. Sm.* Acropteris, *Link.* Tarachia, *Pr.* Brachysorus, *Pr.* Hypochlamys, *Fée.* Lotzea, *Kl.* Orthogramme, *Fée.* Pseudathyrium, *Newm.* Pteriglyphis, *Fée.* Tectaria, *Cav.* Microstegia, *Pr.*)

Sori involucrate, linear or oblong, scattered, more or less ob-

lique, dorsal, attached laterally to the one side of a vein, sometimes double, then opposite, one on each side the vein. *Involucre* of the same form, plane or fornicate, rarely curved or hippocrepiform, when single opening towards the costa or costule, and when double (diplazioid) opening in opposite directions.—Ferns *of varied habit and aspect, inhabiting tropical and temperate climates.* Caudex *or* rhizome *short and erect, or decumbent, or creeping.* Fronds *tufted or sparse, stipitate, simple or more or less divided and compound.* Venation *extremely variable, free or anastomosing.*

As may be expected, from my general observations on the genera of Ferns in the previous pages, I am more favourable to the views of those who retain the Linnæan or Swartzian genus *Asplenium* in its integrity, than to those of Presl, J. Smith, Fée, and Moore, who in going, as it appears to me, to the opposite extreme, form genera founded upon characters which a more extended acquaintance with fern-structure show to be often fallacious. I may instance the following among such as are generally adopted by modern systematists. *Thamnopteris*, judging from the species J. Smith and Moore and Presl have referred to it, these have not, all of them, "the venules united at their apices by a continuous slightly arcuate marginal vein," and nothing can be more contrary to nature than the separation of *Aspl. serratum* from *Aspl. Nidus.* So close is the resemblance that Raddi figures and describes the former under the name of *Aspl. Nidus.* Some true *Asplenia* have *partially* the venation of *Thamnopteris. Cænopteris*, Berg. (or *Darea*, Sm.) gradually passes into *Asplenium*, and though, as Mr. Brown justly observes, the involucres are marginal, and open outwards on account of the narrowness of the lobes, "intus vero, quoad costam e qua vena fructifera ortum ducit, libera." In respect to *Diplazium* and its allies, there are many species which exhibit as much of the single involucre as the double, and there are all intermediate grades. This is indeed acknowledged by Mr. Moore, who says: "The limit between it (*Diplazium*) and *Asplenium* is not very definite, in consequence of some species having but few of the double sori. We do not refer it back to *Asplenium*, because the genus is already sufficiently unwieldy. We include in it all species which produce twin sori with any degree of constancy:" while in many species nothing, as experience has proved to me, can be more inconstant. In regard to venation, a most singular instance of its inconstancy occurs in the *Callipteris elegans* of J. Smith. Perhaps the majority of specimens have the anastomosing venation supposed to distinguish the genus. It is probably not generally known that the *Diplazium fraxinifolium*, Wall., which has free venation, *quite* free *in general*, is identical with *Callipteris elegans!* *Tarachia* of Presl (happily, I believe, rejected by all other Pterodologists), which, by relieving the truly overburdened genus now under consideration of some forty species, would, if it were clearly defined, be very acceptable, is characterized by exhibiting sori of *Asplenium*, *Diplazium*, and *Scolopendrium*. Where practicable, I have endeavoured to employ the characters of these supposed genera for sectional or subsectional ones; though their instability very much invalidates their use even then, as I shall have occasion to remark.

A. THAMNOPTERIS. *A marginal longitudinal vein just within edge is present, with which the apices of the transverse simple or forked veins unite, and there only. Sori of* Euasplenium. *Fronds in all undivided.*

1. A. (Thamnopteris) *Nidus*, L.; fronds ample 2–6 feet long spathulato-lanceolate acute or acuminate at the apex tapering

at the base and more or less decurrent upon a short or elongated stipes, costa semiterete at the back, sori extending from the costa and reaching about halfway towards the margin. —*Linn. Sp. Pl. p.* 1537. *Sw. Syn. Fil. p.* 74. *Willd. Sp. Pl.* v. *p.* 303. *Wall. Cat. n.* 198. *Hook. Bot. Mag. t.* 3101. *Mett. Asplen. p.* 85. Thamnopteris Nidus, *and* orientalis, *Pr. Epim.* 68. Thamn. Mauritiana, *Pr. Epim.* 68. Neottopteris Nidus, *J. Sm., Fée, Brack.?*

Hab. East Indies, N. to Himalaya, and Malay Islands abundant. *Luzon, n.* 15, *Cuming:* one specimen with black lines of sori on a very pale frond. Mauritius, *Sieber, n.* 57 (Thamn. Mauritiana, *Pr.*), *Helsinger* and *Bojer*. Penang and Rangoon, *Wallich* (ordinary size and form, about 3 feet long and 4 inches wide, moderately acuminated, decurrent at the base into a stipes a few inches long). Elizabeth Island, *n.* 1366, *Cuming* (fronds abrupt and even cordate at the base, and sessile). Oahu, Sandwich Islands, *Seemann*. Society Islands, *Bidwill* (almost the size and habit of *A. musæfolium*). S. China, ordinary form, tapering below, and stipitate. Canton, *Vachell* (Neottopteris rigida, *Fee, Gen. Fil. p.* 203. Hongkong, *Wilford, n.* 331 (slightly tapering at the base, and nearly sessile). Chusan, *Alexander* (small). Bonin Isles (*Imp. Acad. Petersburg*), *C. Wright*. Australia, Illawarra, *Brackenridge*! (probably our *A. Australasicum*) Barnard Isles, off Cape York, N. Australia, *J. M'Gillivray*. Norfolk Island, *C. J. Simmonds, Esq.* St. Mary, Madagascar, *Forbes*.—From Assam and Malacca one specimen dichotomously (2 or 3 times) forked, the segments more or less divergent. —This species is probably an inhabitant of tropical and subtropical regions generally in the Old World, and holding there the same place that its close affinity, in form and appearance, *A.* (§ Euasplenium) *serratum* does in the New. I have been more full than may be considered necessary in giving localities to so common a species; but I have done so for the opportunity it affords of noticing some variations. Individually the specimens vary not only in size and outline, more or less obtuse or acuminated, and more or less obtuse or tapering at the base, but in texture and tone of colour, as seen in the herbarium.

2. A. (Thamnopteris) *musæfolium*, Mett.; fronds very ample 4–6 feet long chartaceous broad-oblong more or less suddenly acute or obtuse or even retuse gradually decurrent into a narrow stipitate base, costa semiterete at the back, sori extending from the costa about halfway towards the margin or almost close to the margin (in the latter case covering almost the entire back of the frond).—*Mettenius. Asplen. p.* 85. Neottopteris musæfolia, *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 409 (*name only*). N. elliptica, and N. stenocarpa, *Fée, Gen. Fil. p.* 203. Thamnopteris musæfolia, *Pr. Epim. p.* 68.

Hab. Luzon, *Cuming, n.* 89. Malacca, *Griffith*. Singapore, *Dr T. Thomson*. —Whether this be a species or a variety of the preceding, it is unquestionably the most noble of all of the genus *Asplenium*, in size and breadth of undivided frond. The name (unfortunately without any description) is given by Mr. J Smith to a Luzon Fern, n. 89, of Mr. Cuming's collection Of this, two states are in my herbarium: one a *portion* only of a frond, measuring 2 feet 7 inches in length and 9 inches in its greatest diameter: the sori are rather distant (one or more intermediate veins being sterile), and extend from the costa almost to the mar-

gin; they are prominent and the involucres are rigid. The other specimen is peculiar in its paler colour, with much shorter sori in close compact lines, very slightly prominent (as in *A. Nidus*). Griffith's plant from Malacca exactly agrees with this, but the sori are neither so compact nor so prominent. Mr. Cuming's most perfect specimen of this measures 6 feet in length, and is 1 foot in diameter in its broadest part. Still I find states of *A. Nidus* among the very copious specimens in my herbarium which lead me to the belief that *A. musæfolium* is only a very luxuriant condition of that plant, due perhaps to deep rich soil and great heat and moisture; Mettenius quotes Cuming's n. 15 and 59 for *A. musæfolium*. The latter number is probably an error for 89, and the former (15) is that which is properly referred by Mr. J. Smith to *A. Nidus*.

3. A. (Thamnopteris) *Australasicum*, Hk.; caudex short erect scarcely any, fronds ample fasciculate subsessile coriaceo-chartaceous broad-lanceolate acuminate glossy narrowed below or dilated at the rather obtuse base, costa especially below sharply carinated at the back often ebeneous, veins close parallel horizontally patent, sori very narrow-linear generally occupying the disc of the frond in the upper half.—*Hook. Fil. Exot. t.* 88. *Metten. Asplen. p.* 85. Neottopteris Australasica, *J. Sm. Cat. Cult. Ferns, p.* 49. Aspl. Nidus, *Br. Prodr. p.* 150. *Mueller, in Herb. Nostr.*

Hab. Australia, *Brown*, and adjacent islands. Moreton Bay, *F. Mueller*, *Mr. Flood*. New Hebrides and Fiji and adjacent islands, *Milne* (Voyage of H.M.S. Herald).—The figure and description of this fine *Asplenium* in the 'Filices Exoticæ' was drawn up from our living plant in the Royal Gardens of Kew, and there most assuredly the character indicated by Mr. Smith to distinguish it from *A. Nidus* is evident enough, the very acute keel to the costa, and this, below especially, of an ebony-black colour: but having said this, I have said all which can by possibility separate it from the *A. Nidus*. Striking as that character is, in comparison of the semiterete and often depressed back of the costa in its near ally, its sufficiency must depend upon its constancy, and I am bound to say that in the dried state these marks often fail to be seen. The accurate Brackenridge does not notice the carinated costa among the numerous varieties of *A. Nidus* he has noticed in Australia and adjacent Pacific Islands: and in some East Indian specimen of *A. Nidus* in a dried state, I have observed a projection of the bark of the costa into an imperfect or obtuse keel. On the whole I am disposed to think that this, like *A. musæfolium*, has no valid grounds of separation from *A. Nidus* to rest upon.

4. A. (Thamnopteris?) *pachyphyllum*, Kze.; "frond thick coriaceous firm glossy linear-lanceolate rather obtuse much attenuated towards the base the margin thickened reflexed subrepand obsoletely remotely veined, veins patent quite simple, sori on the superior half of the frond distant from each other as well as from the costa and margin, stipes very short nigro-paleaceous at the base and on the cæspitose caudex, radicles fusco-tomentose." *Kze. in Bot. Zeit.* vi. *p.* 146.—*Metten. Asplen. p.* 87. Thamnopteris, *Pr.* Neottopteris, *Fée.*

Hab. *Java, Zollinger*, n. 2414.—This I have not seen. Mettenius and Preul and Fée refer it to the *Thamnopteris* group of *Asplenium*. Kunze's remark, "A præcedentibus fronde incrassata, nitida, obtusa, soriisque remotis distinctum," scarcely seems to justify this: for the only "preceding" species of *Asplenium* described by him are,—1. *Aspl. simplex*, Bl., expressly said to be a "*Neottopteris*;" followed by, 2. *A. tenuicaule*, Kze., and *A. squamulatum*, Bl., both of the section *Euasplenium*, if we understand them rightly. As, however, the species is distributed in Zollinger's collections (n. 2414), it is probable that so accurate a botanist as Mettenius has determined this point satisfactorily. Kunze says nothing of the union of the veins at their apices.

5. A. (Thamnopteris) *Phyllitidis*, Don; fronds tufted small, about 1½ foot long 2 inches and more wide lanceolate subcoriaceous tapering at the base sessile or decurrent into a more or less elongated stipes, costa at the back below subacute, veins approximate spreading (less so than in some of the preceding species, sori also shorter generally rather distant).—*Don, Prodr. Nep. p.* 7. *Metten. Asplen. p.* 87 (*excluding the* Neottopteris stipitata, *J. Sm.* Neottopteris Phyllitidis, *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 400. *Brack. Fil. U.S. Expl. Exped. p.* 176. Asplenium simplex, *Bl. En. p.* 174.

Hab. East Indies, frequent: Nepal, *Wallich in Herb. Nostr., sine num.* Assam, varying from 10 inches to 2 feet in length, *Simons.* Khasya to Sikkim, *Hook. fil. et Thomson* (with a narrow apex, otherwise passing into *A. Nidus*), *Griffith* (fronds sessile). Madras Peninsula, sometimes proliferous at the apex, *Wight.* Malacca, *Dr. Cantor.* Penang, *Sir Wm. Norris.* Isle of Samar, *Cuming*, n. 319 (specimens when dry of a darker colour than usual). Java, *Blume.* Luzon, *Brackenridge.*—Assuredly if we had only to consider our smallest specimens of this supposed species, of scarcely 10 inches in length and 1 inch in breadth, and our largest of *A. musæfolium*, nearly 6 feet long and almost a foot wide, few would be so bold as to pronounce them otherwise than very distinct; yet such are the gradations through the several states and conditions of the intermediate *A. Nidus*, that I am free to offer my opinion that it would be better to unite them. No dependence can be placed on the relative length of the sori (or of the fronds producing them), and as little upon their direction, more or less divergent. Generally the narrower the frond the less horizontal the sori, the shorter and the more distant. The sessile or stipitate fronds afford no character.

I fear I have led Dr. Mettenius into an error by my remark on the close affinity of *Neottopteris stipitata*, J. Sm., and my then not being able to distinguish it from his *N. Phyllitidis*. I have since ascertained that, with the most perfect resemblance in form, *N. stipitata* has no intramarginal longitudinal vein connecting the transverse veins; consequently that it is not a *Neottopteris* (Thamnopteris, *Pr.*) at all! and is here transferred to our *Euasplenium* section.

6. A. (Thamnopteris) *Grevillei*, Wall.; fronds tufted subcoriaceous 1½ foot long pale-whitish-green when dry spathulate (or oblong-ovate finely acuminate suddenly contracted at the base and decurrent upon a long winged stipes), veins compact horizontally patent, sori linear very narrow occupying the upper half or the entire broad portion of the frond rather

distant.—*Wall. Cat. n.* 1036. *Hook. et Grev. Ic. Fil. t.* 128. Thamnopteris Grevillei, *Moore, Ind. Fil. p.* 50.

Hab. Tavoy, *Dr. Govan, Wallich.* Mishmee, *Helfer.*—Both the fertile fronds and young sterile ones have the remarkable spathulate form, as shown in the 'Icones Filicum.' This and the *A. Simonsianum* are the most distinct, and, as far as I can judge from all the specimens that have come under my notice, are the most constant and uniform in character of the *Thamnopteris* group.

7. A. (Thamnopteris) *Simonsianum,* Hook.; small, fronds 1½ foot long 1½ inch broad cæspitose chartaceous elongato-lanceolate abruptly and narrowly acuminate (rostrate) gradually and very much attenuated below into a short stipes, veins approximate suberecto-patent, sori copious rather distant, three-fourths the length of the veins and occupying three-fourths of the superior portion of the frond.—*Hook. Ic. Plant. t.* 925. *Metten. Asplen. p.* 86. Thamnopteris Simonsiana, *Moore, Ind. Fil. p.* 50.

Hab. East Indies; Khasya and Unker Hills, *Simons.*—While suggesting the diminishing the amount of species of other botanists of this *Thamnopteris* group of *Asplenium*, I may stand exposed to the charge of needlessly adding to their number in the present instance. I can only say that with several fronds in my possession, I have never seen this vary in its form or characters. It is a particularly neat and elegant species, very narrow-lanceolate, gradually decurrent below into a very short stipes, and with the apices of their fronds all rostrate.

B. EUASPLENIUM. *Sori plane or nearly so, single (rarely double or diplazioid). Veins free, simple or branched, rarely in any way anastomosing.*

* *Fronds undivided.*

8. A. (Euasplenium) *serratum,* L.; caudex very short erect, fronds cæspitose 1½–2 or 3 feet long, elongato- or spathulato-lanceolate acuminulate subcoriaceo-membranaceous entire or generally more or less serrated or crenulate or inciso-dentate (towards the apex especially) below gradually attenuated into a short winged stipes, veins linear and sori rather distant varying in length the former clubbed at the apex and terminating near the margin, stipes and rachis often black acutely keeled at the back, in front slightly prominent and depressed.—*Linn. Sp. Pl. p.* 1538. *Sw. Syn. Fil. p.* 74. *Schk. Fil. t.* 61 *and* 64. *Hook. Fil. Exot. t.* 70. *Metten. Asplen. p.* 88. A. crenulatum, *Pr. Tent. Pterid. p.* 106. A. Nidus, *Raddi, Fil. Brasil. p.* 34. *t.* 53 (*not Linn.*). A. integrum, *Fée, Gen. Fil. p.* 193; *and* A. Raddii, A. Schomburgkianum, *Kl.; and* A. longifolium? *Schrad. (according to Mettenius). Plum. Fil. t.* 124.

Hab. Abundant in the West Indies and tropical S. America, extending to the

Pacific, Utria Bay (*Seemann*), Society Islands (*Bidwill* in Herb. Nostr.), and to the Galapagos (*Capt. Wood*); and is, in the New World, the representative of *A. Nidus* in the Old.—More particular localities are given in our 'Filices Exoticæ' above quoted. It is best distinguished, both from *A. Nidus* and *A. Australasicum*, by the absence of the marginal vein; but in the sharply carinated costa it most resembles the latter species. All the fronds of the numerous specimens I have seen of this plant are attenuated gradually at the base into a short stipes: never broad and obtuse there, nor quite sessile. A singular variety is in my Herbarium, with the fronds deeply and irregularly incised at the margin; gathered in French Guiana by Le Prieur.

9. A. (Euasplenium) ***sinuatum***, Beauv.; caudex scarcely any, fronds fasciculated 1½ foot long coriaceous lato-lanceolate scarcely acuminate entire subsinuate attenuated gradually at the base into a short black shining semiterete stipes grooved in front, costa below at the back nearly plane, in front singularly prominent and slightly channelled, veins rather distant free and clubbed at the apices, sori linear narrow occupying much of the frond between the costa and margin.—*Beauv. Fl. d'Oware et de Benin*, ii. *p.* 33. *t.* 79. *f.* 1. *Hook. Fil. Exot. t.* 61. *Metten. Asplen. p.* 88. A. Africana, *Desv., and* A. Guineense, *Schum.* (*fide Mettenius*).

Hab. Western Tropical Africa; Oware, *Palisot de Beauvois*. River Nun, *Vogel*. Fernando Po, on Oil-Palms, *Barter*, in Baikie's Niger Exped.—This very much resembles those states of *A. serratum* of the tropics of America, with entire margins to the frond, and I should probably have referred it to that species, had not the possession of it in a living state enabled us to distinguish characters scarcely visible in the dried specimens, viz. that the back of the costa is remarkably depressed, while the front is unusually prominent, as shown in our figure in 'Filices Exoticæ.'

10. A. (Euasplenium) *Currori*, Hook.; fronds glabrous 1½ foot long about 1½ inch broad submembranaceous loriformi-lanceolate acuminate scarcely attenuated and very obtuse at the base, stipes scarcely any, veins rather distant as well as the linear sori which are suberecto-patent, occupying a good portion of the frond and neither extending to the costa nor to the margin.

Hab. W. African coast, south tropics, near Elephant's Bay, *Dr. Curror*.—I have seen no caudex of this species, but my otherwise perfect specimens possess the very short stipes, about 2 lines long. The base of the frond is scarcely at all contracted or decurrent, but obtuse below. The breadth of the frond is therefore pretty uniform for the greater part of its length, giving it a loriform character. The veins and the sori are more distant than is usual in this group, and their direction much less patent. Its affinity is perhaps with *A. sinuatum*, from which the above characters and the want of the long stipes will readily distinguish it. The frond is also much more membranaceous.

11. A. (Euasplenium) ***squamulatum***, Bl.; caudex short thick, fronds tufted coriaceo-membranaceous 1½ foot long 2–3

inches wide broad-lanceolate more or less acuminate gradually tapering from a little below the middle into a pale-coloured slightly winged stipes 2–5 inches long, stipes and under side of the frond towards the base especially near the costa (which is depressed above) clothed with fringed brown appressed scales which are eventually deciduous, veins approximate horizontally patent quite free and terminating just within the slightly thickened margin, sori linear narrow rather distant, sometimes extending to near the margin and even occupying almost the whole length of the frond.—*Bl. En. Fil. Jav. p.* 174. *Kze. in Bot. Zeit.* vi. *p.* 145. *Metten. Asplen. p.* 90. Thamnopteris, *Pr.* Neottopteris, *Fée.* Neottopteris stipitata, *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 409.—*β*? *Smithii*, esquamose, base of the frond very obtuse scarcely at all decurrent on the wingless stipes which as well as the lower half of the costa is ebony-black.—Neottopteris stipitata, *J. Sm. Cat. of Cult. Ferns, p.* 49.

Hab. S. Camarine Islands, *Cuming*, *n.* 195. On limestone rocks, Borneo, Sarawak, *Thos. Lobb;* Banjermassing, *Motley*. Java, *Blume*, *Zollinger*, *n.* 960 *z.* —*β*? Only known in the stove of the Botanic Gardens of Kew.—*Neottopteris stipitata* is a name, without description, given to the *Asplenium*, *n.* 195, of Mr. Cuming, from the S. Camarine Islands: bearing, in general aspect, so great a resemblance to smaller specimens of *A. Nidus*, and especially to the species or variety *A. Phyllitidis*, and the venation being indistinct owing to the opaque substance of the frond, it was no wonder Mr. J. Smith should refer it to his genus *Neottopteris:* all authors who have adopted the species have done the same; but a recent examination of original specimens in my herbarium has shown that the veins are all free at their apices, terminating within the thickened margin of the frond, unconnected with any intramarginal vein. This circumstance, together with the presence of a clothing of fringed scales near the base of the frond, and other characters, have satisfied me that the plant is the *Aspl. squamulatum* of Blume, and which, notwithstanding Presl and Fée refer it to the *Thamnopteris* group, Mettenius properly transfers to *Euasplenium*.

There has been for some time cultivated in the Royal Gardens of Kew an *Asplenium*, believed to be raised from spores of Mr. Smith's *Neottopteris stipitata*, and consequently bearing that name: but which differs from our native specimens of the species under consideration, inasmuch as the frond is perfectly destitute of scales, is not attenuated or contracted at the base, but truncated or almost cordate there, the portion only next the costa being decurrent for about a quarter of an inch. The stipes is 3–4 inches long, deeply channelled in front, bluntly carinated at the back, and is, as well as the costa, for more than halfway up, ebony-black. In the recent state the very slightly thickened margin is corneous and pellucid; the veins, very conspicuous when held between the eye and the light, while fresh, are clearly seen to terminate just within the margin; but here and there the apex takes a curve as if to meet an adjacent one, and here and there they arch over and combine, and I have seen as many as three or four thus united: but it is evidently not the normal state of the venation, rather the exception.

12. A. (Euasplenium) *venosum*, Hook.; fronds (not quite

perfect at the base) 2½ feet long 2½ inches wide glabrous firm chartaceous dark-green rather glossy on both sides loriform-lanceolate acuminate quite entire from below the middle gradually and long-attenuated, veins rather distant horizontally patent unusually prominent on both sides (so that they are sensible to the touch) and conspicuous, sori narrow-linear copious terminating short of the margin, involucres very narrow.

Hab. South tropical Western Africa, near Elephant's Bay, *Dr. Curror*. This is another south tropical *Asplenium* which I can refer to no described known species, and to which, from its size, like many others, it would not be possible to do justice by a figure in a work like this. It may rank near *A. sinuatum* and *A. Currori*, yet has a habit and form and size and colour (difficult as these may be to define in words) which forbid my uniting it with any species known to me. The very distinct and prominent, and, if I may so say, tangible venation, is a remarkable feature, as is the very long tapering base (both specimens unfortunately are destitute of stipes). The veins extend to the slightly thickened margin, and appear to unite with it: but there is no intramarginal vein, as in the *Thamnopteris* group.

13. A. (Euasplenium) *scolopendrioides*, J. Sm.; fronds simple lanceolate chartaceo-membranaceous (in our only perfect specimen suddenly caudato-acuminate) entire or very obscurely serrated towards the apex, much and gradually tapering at the base into a short stipes on which are a few small appressed scales, veins rather distant horizontally patent, sori moderately broad linear, involucres of *the same colour and texture as the frond*, when dehiscent *leaving a distinct elevated line upon the frond corresponding with its attachment before separating.—J. Sm. in Hook. Journ. Bot.* iii. *p.* 408 (*name only*). *Hook. Ic. Plant. t.* 930 (*or Cent. of Ferns. t.* 30). *Metten. Asplen. p.* 89.—Var. *β*? *longifolium*; fronds (judging from very imperfect specimens in my possession) 3 feet long.

Hab. Island of Leyte, Philippines, *Cuming*, n. 318.—Var. *β*? Dahumkung River, Kina Balu, elev. 3000 feet, Borneo, *Hugh Low, Jun., Esq.*

My figures and descriptions in Ic. Plant. were taken from a solitary specimen of this plant, which presents at first sight no very remarkable feature in form, venation, etc., I should have had no hesitation in considering it *A. Sundense*, Bl. (*A. Fejense*, Brack. in Fil. U. S. Expl. Expedition), but for a peculiarity in the sori, which I thus characterized: "Soris linearibus, involucris subgeminatis superiore angustissimo veniformi" (*reniformi* in Ic. Pl. by misprint): and again, in the observations, I remarked of the involucres, that "on the inner and upper side a nerve-like line will be seen to run parallel with, and of the same length as, the involucre, leaving a narrow area between it and the insertion of the involucre on the vein: this line is caused by a slender membrane, evidently a portion of the involucre, remaining after the dehiscence." Mettenius, who does not appear to have seen a specimen, seems to object to my

definition, and adds, "Mea autem sententia istud indusium superius minime est verum indusium, sed stria marginem liberum indusii Asplenioidei paginæ inferiori arcte adpressi circumdans, indusio siccitate contracto conspicua." The impression I meant to convey was that the indusium or involucre does not dehisce as in other *Asplenia*, leaving no trace on the frond, but that it separates into two unequal portions; the one (outer) broad, the other (inner) narrow, and thus I used the term subgeminate. Happily another specimen of, I believe, the same species, in a very mutilated state it is true, has reached me from Borneo, in which, however imperfect the fronds, the sori are far more perfect than in my original plant, in which, I would observe, that where the sorus is most complete, it entirely agrees with those of my Borneo plant. The first peculiarity here exhibited is that the involucre is of the same firm texture as the frond, and when the broader and inferior portion of the involucre separates, *within* is a depression on the frond, and the appearance of a membrane lining the cavity, this is more satiny and glossy than the superficies of the frond, its outer edge forming *a most distinct elevated ridge*, to which in an earlier stage the margin of the larger valve was attached: in short, the appearance is exactly as if the slender pod of some bivalved leguminous plant were pressed down upon the frond, and which, on its opening longitudinally, exhibits the seeds attached to a receptacle in the axis. In other words, we have in this structure what the learned Brown described in his genus *Allantodia*, an involucre which completely *surrounds* the line of capsules, opening longitudinally; here however of a firm, not membranous, texture, and opening with an entire outline. I have at present seen nothing exactly of this kind in any other Asplenioid plant.

With regard to the var. I have called β *elongatum*, it is so imperfect as regards the fronds (one-half at least of their length apparently broken off), that I should hardly have ventured to have referred it here, but for the peculiar nature of the sori. The caudex is long, creeping underground, here and there rooting, as thick as the quill of a writing-pen.

14. A. (Euasplenium) *vittæforme*, Cav.; "frond linear subcrenate subpilose beneath, sori transverse between the costa and margin nearly equal." *Cav. Prælect.* 1801, *p.* 255. —*Sw. Syn. Fil. p.* 74. *Willd. Sp. Pl.* v. *p.* 306. *Bl. En. Fil. Jav. p.* 174? *Met. Asplen. p.* 89?

Hab. Palapa, Marianne Islands (*Sw.*).—As there is no figure existing of this plant, and nothing in the form of descriptive character beyond that above given by Cavanilles (together with that author's further remark, "Frons sesquipedalis, duodecim vel sedecim lineas lata"); and, since neither Swartz nor Willdenow, nor any more recent botanist, has identified the plant, I dare not venture to refer Mr. J. Smith's Cumingian *vittæforme* here: but rather to the following species (*A. Sundense*), with which we can with more confidence say it is identical.

The *A. vittæforme* of Blume may or may not be the same as Cavanilles's *vittæforme*. The following is Blume's definition: "Frondibus stipitatis lineari-lanceolatis elongatis acuminatis basi oblique cuneatis subrepandis inæqualiter crenulatis membranaceis glabriusculis, venis furcatis, soris remotiusculis, stipite glabro."—Can this be *A. Fejeense* of Brackenridge?

15. A. (Euasplenium) *Sundense*, Bl.; caudex creeping terete entirely free from scales or roots a foot long 1 or 1¼ inch wide oblong- or sublinear-lanceolate submembranaceous abruptly caudate at the apex the base rather suddenly and

unequally attenuated into a glabrous stipes 2–3 inches long, the margin obscurely crenulate, veins nearly horizontal approximate, sori narrow-linear crowded reaching nearly to the margin and occupying the whole length of the frond, involucres very narrow.—(The above character is taken from a specimen communicated by Blume.)—Var. *β majus;* portions of specimens (all wanting stipes and lower part of the frond) 1½ to 2 feet long and 2–3 inches wide, nearly the entire of the under side exhibiting a mass of parallel and nearly horizontal lines of fructification frequently extending quite to the margin.—*Bl. En. Fil. Jav. p.* 175. A. vittæforme, *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 408 (*vix Cav.*). *Metten. Asplen. p.* 89 (*as regards his reference to Cuming's plant*). A. Callipteris, *Fée, Gen. Fil. p.* 193.

Hab. Mountain woods, Java, *Blume, in Herb. Nostr.* Isle of Leyte, Philippine Islands, *Cuming*, n. 308.—Var. *β majus.* Angau, Naviti, and Ovolau, Feejee Islands, *Milne*, n. 204, 246, 291, *and* 309.—Whether or not it be owing to the brittleness of this plant, it is the case that all the specimens, some of them pretty large too, are more or less broken; Dr. Blume's specimens alone possessing the stipes and even a portion of the caudex. Cuming's specimen has neither base nor apex, yet it seems identical with *A. Sundense:* a remarkable feature in which is the copious and very compact, nearly equal, prominent, and almost horizontal lines of fructification. Milne's specimens are all much larger than our Java plant; in them the fructification is much advanced, and the sori almost conceal the frond. In that state the frond becomes somewhat chartaceous and more opaque.

16. A. (Euasplenium) *Amboinense*, Brack. (an Willd.?); caudex creeping moderately stout rooting and densely clothed as is the base of the stipes with subulate black scales, fronds a foot and rather more long 1½ inch wide submembranaceous lanceolate suddenly contracted at the apex into a narrow caudate acumen and there gemmiferous,* below gradually attenuated into a short winged stipes, the margin subentire or subcrenate especially towards the apex, veins horizontally patent, sori subdistant and rather irregular often extending to the margin, involucres narrow-membranaceous.—*Willd. Sp. Pl.* v. *p.* 303? *Brack. Fil. U.S. Expl. Exp.*† *p.* 147. *t.* 19. *f.* 2. *Metten. Asplen. p.* 90. *Moore, Ind. Fil. p.* 112. A.

* I suspect the abruptly *caudate apex* of this and some allied species of *Asplenium* (for I believe it is not invariably present) is occasioned by the formation of a gemma, which absorbs the nourishment, and gives this form to the point.

† In consulting the beautiful plates of this work, the student needs to be informed that it is the practice, where there are two species on a plate, to put the wrong name immediately *under* the species. In t. 19, for example, the left-hand figure is No. 2, "*A. Amboinense*," and under it is written, "1. *A. Fejeense:*" and the name *A. Amboinense* is written under *A. Fejeense.*

tæniosum, *Kze. in Bot. Zeit.* vi. *p.* 145. Thamnopteris, *Pr.* Neottopteris, *Fée.*

Hab. Amboina? *Ventenat.* Ovolau, Feejee Islands, *Brackenridge, Milne, n.* 291 (bearing the same number as a specimen I have referred to *A. Sundense*). Java, *Zollinger.*—I cannot but feel doubtful of this being Willdenow's *A. Amboinense*, of which the fructification was unknown to the author, and the scales of the stipes of which he describes as ovate and brown, whereas they are narrow-subulate and black. Brackenridge's figure is excellent, exactly corresponding with our plant (from the same island, too), save that the veins and fructification are represented as almost quite transverse or horizontal, whereas ours are between patent and horizontal; and, since the expression used by the author is "venæ oblique parallelæ," the artist is perhaps a little in fault. The species I cannot but look upon in many respects as intermediate between *A. Sundense*, and the following, *A. Fejeense:* from the former it differs in the less horizontal sori, and from the only stipes and caudex I have seen of *A. Sundense*, which are quite naked, in these being clothed with black subulate scales.

17. A. (Euasplenium) *Fejeense*, Brack.; "stipes a span long squamose at the base," fronds 1½–2 feet long 2 inches broad subchartaceous bright-green elongato-lanceolate sometimes caudate or more frequently rather acuminate often proliferous at the apex below, moderately attenuated into a subcuneate base, the margin subrepand otherwise entire, veins rather distant subhorizontally patent, sori generally unequal and subdistant narrow-linear often extending nearly to the margin, involucres narrow membranaceous.—*Brack. Fil. U. S. Expl. Exp. p.* 147. *t.* 19. *f.* 1. *Metten. Asplen. p.* 90. *Moore, Ind. Fil. p.* 129.

Hab. On trees and moist rocks, Feejee and Samoan (or Navigators) Islands, *Brackenridge.* Island of Aneiteum, *Rev. Mr. Inglis, C. Moore*, with a rambling climbing stem (caudex) which sometimes reaches the tops of the highest trees,—*M'Gillivray, n.* 92; *Milne, n.* 300.—Although I possess tolerably copious specimens of this plant, as in the case of *A. Sundense*, I have no unbroken specimen, no stipes or base of the frond; and the stipes is unknown except as noticed by Mr. C. Moore above. Yet I think it is impossible to doubt the plant being the *A. Fejeense* of Brackenridge: the shape and size of the frond and the sori perfectly correspond, and, in the absence of stipites to the full-sized fronds, the presence of a comparatively long stipes may be expected from that of the young fronds germinating from the gemmæ exactly as represented by Brackenridge. The sori and veins do vary somewhat in their direction on different individuals: the larger size and long stipes will however distinguish it from *A. Amboinense*, and the oblique, not horizontal, sori from *A. Sundense.*

18. A. (Euasplenium) *Griffithianum*, Hook.; caudex short thick subrepent, fronds cæspitose span to nearly a foot high an inch in diameter subcoriaceous pale-green with scattered small scales lanceolate shortly acuminate tapering gradually below into a short winged stipes the margin rather deeply and coarsely crenato-serrate, the narrow acumen excepted,

veins rather distant subhorizontally patent, sori distant short and rather broad two-thirds the length of the vein, involucres pale-coloured firm-membranaceous.—*Hook. Ic. Plant. t.* 928 (*or Cent. of Ferns, t.* 28). *Metten. Asplen. p.* 89.

Hab. India; Mishmee, *Griffith*. Sikkim below Darjeeling, *Dr. T. Thomson*. Assam, *Simons*.—A very distinct species.

19. A. (Euasplenium) *Gautieri*, Hook.; small, caudex short stout ascending copiously rooting sparingly paleaceous with subulate black scales, stipites tufted compressed dark brown 1–4 inches long winged above with the decurrent base of the frond setose below, fronds herbaceo-membranaceous subpellucid 2–4 inches long elliptical-lanceolate obtusely acuminate subentire coarsely and obtusely serrated towards the apex and there rooting and proliferous the base gradually decurrent upon the stipes, veins erecto-patent distant internal forked at or below the middle terminating at a little distant from the margin, sori distant linear neither extending to the costa nor to the margin, involucres brown membranaceous. (Tab. CLXXXIV.)

Hab. Island of Nissobé, between Madagascar and the eastern coast of Africa, *Gautier in Herb. Nostr.*—A very pretty species of the simple-fronded *Asplenia*, which may rank next to *A. Griffithianum*, Hook.; but from which it is abundantly and specifically distinct. It is, too, very uniform in character; one frond only producing a solitary lobe, which seems to be abnormal The fronds are very thin membranaceous and semi-pellucid, of a uniform darkish-green colour, with no broad stramineous costa as in *A. Griffithianum*. The apices are generally proliferous.

20. A. (Euasplenium) *concolor*, Hook.; small, a span high, caudex short subrepent clothed with dense tomentose roots and bearing a few black subulate scales at the summit, fronds tufted elliptico-lanceolate rather obtusely acuminate the apex coarsely crenato-serrate subcarnoso-coriaceous green (as well as the stipes) rather suddenly attenuated below into a winged stipes 2 inches long, veins rather distant moderately patent, sori linear copious on the veins and occupying nearly the whole back of the frond. (Tab. CLXIV. A.)

Hab. Java, *Thos. Lobb*.—Unwilling to multiply species needlessly, I cannot but hesitate in giving this species as distinct, possessing as it does few tangible characters that can be described in words. Can it be the *A. cæspitosum*, Bl. En. Fil. Jav. p. 175, of which all the character offered is "Frondibus stipitatis utrinque attenuatis crenulatis membranaceis glabris, venis furcatis, soris remotis, caudice cæspitoso paleaceo;" a native of Java. To which is added, "ab *Aspl. angusto*, Sw., et speciebus præcedentibus (*A. villæforme*, Cav., *A. Sundense*, etc.) distinguitur fronde haud elongata." The nearest affinity among species known to me

is certainly with my *A. Griffithianum*, but that is a very pale-coloured plant, the stipes not at all herbaceous, the fronds more lanceolate, the apex more acuminate, and the margin coarsely crenato-serrate.

21. A. (Euasplenium) *coriaceum*, Fée; "fronds simple rigid coriaceous opaque lanceolate attenuated at both extremities, the margin entire convolute when dry, sori narrow very long, indusium very narrow, proliferous nervils prominent (*in receptaculo nigrescente mutata*), capsules ovate, annulus 18–20 and more articulate, spores ovoid (*latoepisporatis*)."—*Fée, Gen. Fil. p.* 193. *7me Mém. Foug. p.* 46. *t.* 15. *f.* 1.

Hab. Mexico, *Galeotti* (*sine num.*), *Fée*.—M. Fée says, "Cette fougère a le port de *Pteropsis angustifolia*," but surely much more does it resemble (judging from the figure) our *Aspl. ensiforme* just described. Mettenius (to whom, as to me, it is unknown) justly observes, "Patria, sed non charactere, ab *Aspl. ensiformi* diversum videtur." Only a solitary specimen, without caudex or rhizome, seems to have been known to the author.

22. A. (Euasplenium) *angustum*, Sw.; caudex short creeping paleaceous with rigid dense subulate scales, fronds tufted 1–2 feet long 1–1½ inch wide, chartaceous pale-green narrow-lanceolate very finely acuminated, below gradually tapering into a very short stipes entire very obscurely serrated in the acumen, sparsely paleaceous with minute scales, veins rather distant obliquely patent, sori linear moderately broad extending nearly to the margin and occupying almost the whole face of the frond.—A. angustum, *Sw. Vetensk. Acad. Handel*, 1817, vi. *p.* 6. *t.* 4. *f.* 1. *Kze. Annal. Pterid. p.* 21. *t.* 14. *Mett. Asplen. p.* 89. A. loriforme, *Hook. Ic. Pl. t.* 926 (*or Century of Ferns, t.* 26). A. Surinamense, *Fée, Gen. Fil. p.* 192 (*Metten.*). A. Weigelti, *Kfs.* (*MS.*), *according to Kze.; and Presl gives* A. lanceola, *Sw.* (ubi?), *as a synonym of* Weigelti.

Hab. Guiana (*Weigelt, Kegel, Hostmann*), *Schomburgk*. Brazil, near Pará, *Spruce*.—A well-marked and graceful species, of which only small specimens are figured by Presl in his 'Tentamen Pteridographiæ.' Some of our fronds from Pará are 2 feet long, slender and loriform.

23. A. (Euasplenium) *ensiforme*, Wall.; caudex short thick scarcely repent bearing dark-brown subulate scales at its summit and at the base of the stipes, fronds cæspitose a span to 1 and 1½ foot long ½ to ¾ inch broad linear-lanceolate elongate firm coriaceo-carnose brownish-green entire gradually acuminated and gradually and finely attenuated at the base into a petiole 2 or more inches long, veins sunken

erecto-patent usually once-forked, sori linear broad in age neither extending to the costa nor to the margin, about half an inch long.—*Wall. Cat. n.* 200. *Hook. et Grev. Ic. Fil. t.* 71. *Mett. Asplen. p.* 145.

Hab. East Indies, frequent. Nepal, *Wallich*. Assam, *Griffith*. Kumaon, 6000 feet, *Strachey and Winterbottom*. Sikkim and Eastern Nepal, elev. 7–1000 feet. Ceylon, *Mrs. General Walker, Gardner*, 1334, *Thwaites* (generally shorter fronds and broader in proportion).—The elongato-lanceolate, thick, carnoso-coriaceous fronds, gradually tapering at each extremity, together with the sunken or immersed veins and their erecto-patent direction, readily distinguish this species from all with which I am acquainted.

Doubtful species with simple fronds.

24. A. (Euasplenium ?) *lanciforme*, Fée, Gen. Fil. p. 193.

Hab. Guiana. Name only.—M. Fée alludes to it under his *Aspl. integrum*, which is itself considered to be a form of *A. serratum*.

25. A. (Euasplenium ?) *linguæforme*, Roxb.; "stipes long and polished, fronds tongue-shaped entire smooth, fructifications in numerous approximated lines over the whole disc and extending almost to the margin, involucre not visible in the dry specimens." *Roxb. in Calcut. Journ. of Nat. Hist.* 1844, *p.* 407.

Hab. Moluccas.

** (Lobatæ; *fronds lobed or palmated.*)

26. A. (Euasplenium) *trilobum*, Cav.; caudex small stout, at the apex clothed with ferruginous imbricated glossy scales, stipites tufted 2–2½ inches long, fronds coriaceous rhomboid acuminate entire crenate three-lobed or tripartite segments acuminated and more or less incised, intermediate lobe the longest, costa very slender, veins immersed several times subflabellato-dichotomous, sori large erecto-patent linear-oblong, involucre rigid brown.—*Cav. Præl.* 1801, *p.* 255. *Willd. Sp. Pl.* v. *p.* 306. *Gay, Fl. Chil. t.* 499. *Mett. Asplen. p.* 146. *Hook. 2nd Cent. of Ferns, t.* 11. *ined.* A. trapezoides, *Sw. Syn. Fil. p.* 76. *Willd. Sp. Pl.* v. *p.* 306. *Schk. Fil. t.* 67. *Gay, Fl. Chil. t.* 499. *Mett. Asplen. p.* 146. A. parvulum, *Hook. Ic. Pl. t.* 222, (*small form*).

Hab. S. Chili and Chiloe, *Poeppig, Cuming, n.* 820, *Capt. P. King, W. Lobb, Lechler, Gay, Harvey, etc.* Peru (?), (*Swartz*). Brazil, *Tweedie in Herb. Nostr.* Marianne Islands (?), (*Willdenow*).—There can scarcely be a question but that the *Aspl. trapezoides* of Swartz is the same as *A. trilobum*, or rather, is the less perfect state of the plant, as our *A. parvulum* certainly is. I was, in this latter, misled

in some degree by its locality, so remote from the well-known stations of the species. There seems no certain authority for its being a Peruvian Fern, still less for its being a native of the Marianne Islands. It is very variable even in fronds arising from the same caudex or rhizome, from rhomboid and undivided to deeply three-lobed. Sori, according to Mettenius, occasionally diplazioid.

27. A. (Euasplenium) *subhastatum*, Hook.; caudex short ascending paleaceous above, stipites tufted 4–6 inches long, fronds subcoriaceo-membranaceous about as long as the stipites opaque pale-green rather broad-lanceolate acute or subacuminate truncato-cuneate at the base and subhastate having an obtuse lobe on each side of the base, the margins quite entire, veins distant, terminating within the margin and clavate, sori linear rather short erecto-patent, involucres narrow membranaceous.—*Hook. Ic. Pl. t.* 929 (*or t.* 29 *of Cent. of Ferns*).

Hab. Caracas, (from *Herb. Miquel.*)—The fronds much resemble small specimens of *Scolopendrium vulgare*, but the sori are truly those of *Asplenium*. Mettenius suggests its being a young and abnormal form of some pinnated species, for example, of *A. salicifolium*, L. It is far from impossible, but the fronds are quite simple and yet bearing perfect sori: and I have seen no intermediate forms.

28. A. (Euasplenium) *Hemionitis*, L.; caudex short oblique subrepent paleaceous with subulate glossy black scales above, stipites tufted 5 to 10 inches long black and paleaceous below, fronds 4–6 inches long hastato-cordate 3–5-lobed chartaceous bright-green, sinus very deep, lateral and superior lobes acuminate, middle lobe the longest, there is a costa to each lobe, veins repeatedly dichotomous subradiate approximate nearly all soriferous, sori extending from the costa to the margin narrow-linear.—*Linn. Sp. Pl. p.* 1537. *Brot. Fl. Lusit.* ii. *p.* 398. *Sm. Tent. Bot. Gen. Fil. p.* 9. *(not of Sw. and Cav.). Hook. Bot. Mag. t.* 4911. A. palmatum, *Lam. Encycl.* ii. *p.* 302. *t.* 867. *f.* 2. *Sw. Syn. Fil. p.* 75. *Willd. Sp. Pl.* v. *p.* 306. *Schk. Fil. t.* 66. *Webb, Pl. Canar.* ii. *p.* 438 (*excl. Syn. Lam. Ill.*).

Hab. Woody regions of North-western Africa, as far south as St. Nicholas of the Cape de Verds, the Azores, Canaries, Madeira, and Spain and Portugal, or South-western Europe. Found by all travellers, who are naturally attracted by its beauty.—I must refer to the pages of the 'Botanical Magazine,' above quoted, for information on the correct nomenclature of this species, elaborated by Mr. Kippist.

29. A. (Euasplenium) *pinnatifidum*, Nutt.; caudex short creeping, stipites 4–6 inches long cæspitose ebeneous at the base, fronds rarely a span long submembranaceous flaccid

decurved minutely setulose beneath, from a broad subhastate base lanceolate very long and finely acuminated deeply pinnatifid almost pinnate below sinuato-lobate above, inferior lobes cordato-ovate sinuato-lobulate or toothed, veins repeatedly dichotomous, sori few in each lobe short linear-oblong solitary in the small superior lobes at length confluent.—*Nutt. in Gen. of N. Am. Pl.* ii. *p.* 51. *Hook. Ic. Pl. t.* 927 (*or Cent. of Ferns, t.* 27). *A. Gray, Man. of N. Am. Bot. p.* 727. *Metten. Fil. Hort. Lips. p.* 72. *t.* 10. *f.* 1. 2.

Hab. United States of America, very rare. Banks of the Schuylkill, near Philadelphia, *Nuttall, Dr. Bromfield, Mr. J. M'Nab.* "Mine la Motte," Southern Tennessee, on sandstone, *Nuttall.*—With much the habit of *Camptosorus rhizophyllus*, it is nevertheless a widely different plant in venation and arrangement of the sori; and the fronds, though the points seem to decline to the ground, do not appear to be rooting or viviparous.

30. A. (Euasplenium) *alternans*, Wall.; caudex short descending copiously rooting squamose with subulate scales as is the very short (rarely an inch long) stipes and base of the costa beneath, fronds cæspitose about a span long, chartaceous very opaque pale-rusty-green beneath glabrous lanceolate scarcely acuminate attenuated below deeply and regularly pinnatifid throughout, lobes ovate or triangular-oblong with wide sinuses obtuse quite entire, veins subflabellato-dichotomous all free, sori copious on all the lobes in two rows linear-oblong erecto-patent, the superior basal one parallel with the costa.—*Wall. Cat. n.* 221. A. Dalhousiæ, *Hook. Ic. Pl. t.* 105. *Metten. Asplen. p.* 147.

Hab. India, *Dr. Wallich* (no certain locality specified: entirely, I believe, confined to the North-west Himalaya, at elevations of 6000 feet, in stony woods), *Lady Dalhousie, Strachey and Winterbottom* (Kumaon), *Edgeworth, Col. Bates* (Simla), *Dr. Thos. Thomson*, and (Chumbra Hills), *Jacquemont*, *n.* 59, 60, 61, *and* 62 (*in Herb. Nostr.*), *Dr. Fleming, Hügel, Hoffmeister.* Abyssinia, *Schimper*, *n.* 288 (*Herb. Hook. from Herb. Paris.*).—This is a very peculiar-looking plant, which but for the absence of the scaly covering might be mistaken for *Aspl. Ceterach*, which also is known to have a minute asplenioid involucre; but then its anastomosing venation would separate it from the present species in a systematic arrangement.

31. A. (Euasplenium) *attenuatum*, Br.; caudex short subrepent copiously rooting, stipites tufted 2–4 or 5 inches long paleaceous with black subulate spreading scales, fronds chartaceous a span to a foot long linear-oblong very much and gradually acuminated (the apex entire and often proliferous the margin sublobato-serrated, below deeply lobed (almost pinnate) with rounded and truncated serrated lobes, veins

forked rather distant very patent, sori linear-oblong patent short.—*Br. Prodr. Nov. Holl. p.* 150. *Hook. et Grev. Ic. Fil. t.* 220. *Hook. Ic. Pl. t.* 914. *Mett. Asplen. p.* 146. Tarachia, *Pr. Epim. Bot.*

Hab. New Holland. Port Jackson, *Brown, Fraser.* Dry shady woods, Brisbane River, *All. Cunningham, F. Mueller.*—A very distinct and well-marked species and of rare occurrence, being found as yet, as far as has come to our knowledge, only in the above localities in Eastern Australia.

32. A. (Euasplenium) *variabile,* Hook.; small, caudex long slender branched creeping slightly scaly rooting with long flexuose fibres, stipites distant ½ an inch to 2–3 inches long partially scaly at the base winged above with the decurrent base of the frond, fronds 2–5 inches long firm-membranaceous and pellucid, young and as far as I have seen sterile ones lanceolate or lyrate variously pinnatifid obtuse or obtusely acuminate, lobes obtuse sometimes shallow sometimes deep the narrow sinuses extending almost to the rachis, in one case the frond is deeply bifid at the apex in another flabelliform, perfect and fertile fronds the largest rather broad lanceolate finely acuminated serrated more deeply towards the apex the base decurrent upon the rachis, veins rather distant forked at the base patent reaching nearly to the margin, sori prominent linear extending from the costa to within a short distance of the margin, involucres very narrow, costa pale almost stramineous beneath. (TAB. CLXXXV.)

Hab. On trees in gloomy forests, Fernando Po, *Barter, in Baikie's Second Niger Expedition.*—This remarkable Fern was gathered by the lamented Barter on two occasions of visiting the island of Fernando Po, and the same variation was each time found in the fronds as here represented.

**** Pinnatæ.* *Fronds pinnate, rarely more compound in the normal state; varying to bipinnate in some forms of* A. difforme, *Br., and even to tripinnate in some other species.*

(Salicifolium-*group. Type* Aspl. salicifolium, *L.; with pinnæ of a large or largish size, generally more than* 2 *inches long, and of a softish texture when recent, but often passing, as it were, into the* Resectum- *and* Furcatum- *and* Trichomanes-*group, by insensible gradations.*)

33. A. (Euasplenium) *macrosorum,* Bert., MS.; caudex

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* I have endeavoured in vain to find tangible characters for the larger or even any groups, into which the genus *Asplenium* (§ *Euasplenium*) can be conveniently divided. Others have met with the same difficulty. Presl, who was the first to give a list of a really large number of species, has only two divisions: 1, "*frons coriacea;*" 2, "*frons herbacea;*" and nothing can be more unsatisfactory. Fée

stout reclinate clothed above with dark-brown subulate fimbriated scales, stipites cæspitose 4–6 inches long ebeneous very glossy, fronds 6–12 inches long cordato-acuminate coriaceo-membranaceous pinnate, pinnæ 5–7 broad-lanceolate acuminated coarsely serrated terminal one the largest 4–5 inches long petiolate lateral ones shorter-petioled lowest pair with a large obtuse lobe or auricle at the inferior base, veins distant oblique once or twice forked, sori at first linear then oblong ½ an inch and more long nearer the margin than the costa, involucre linear subfalcate, rachis and costa ebeneous. (TAB. CLXXVI.)—*Kze. Anal. Pterid. p.* 21. *Colla*, "*Mem. Acad. Turin.* xxxix. *p.* 39. *t.* 37." *Gay, Fl. Chil.* vi. p. 500. *Metten. Asplen. p.* 126.

Hab. On trees, in thick woods, Juan Fernandez, *Bertero*, *n.* 1533.—This fine and rare species is so distinct that it is hard to say what is its nearest affinity, unless to some extremely luxuriant form of *Aspl. trilobum*. I have never seen it more than simply pinnate; but there is a tendency in the lowest pinnæ (as seen in the large lobe at the inferior base) to divide again, so as almost to assume a pedate frond. The sori are very long, at first very narrow, afterwards spreading and quite concealing the involucres, which are thin-membranaceous and more than half an inch long.

31. A. (Euasplenium) *diversifolium*, Bl.; "frond of two kinds, sterile quite simple, fertile ternate or quinato-pinnate, pinnæ amplexicaul cordato-lanceolate acuminate repando-crenulate membranaceous glabrous, stipes and rachis submarginate nearly glabrous." *Bl. En. Fil. Jav. p.* 175.—*Kze. in Bot. Zeit.* vi. *p.* 46. *Metten. Asplen. p.* 175. *t.* 5. *f.* 6.

Hab. Mountain-woods, Java, *Blume* (prov. Bantam), *Zollinger*, *n.* 2628, 2917. —With this I am unacquainted. Mettenius places it next to *A. calophyllum*,

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has equally failed in grouping the species according to countries. The numerous widely dispersed localities of one and the same species, recorded in this volume, render the use of such an arrangement ineffectual. Moore, in his 'Index Filicum,' proposes four sections,—1. *Euasplenium;* 2. *Acropteris* (distinguished from the first by the veins "*flabellato-furcate*, without a costa"); 3. *Darea* (*genus* Darea *or* Cænopteris *of some authors*); and 4. *Allantodia* (*genus* Allantodia, *Br.*): but he justly remarks, "these are distinct enough in their typical species, but merge more or less into each other through other species of intermediate character." I turned with great interest for assistance in this difficult matter to Mettenius on *Asplenium:* but my ignorance of the German language, in which the explanation of the several new terms he employs are alone given, has prevented my benefiting as I could wish from his arrangement, in which too I must confess I find several species placed widely apart, which appear to me naturally allied as individuals. I have endeavoured, as much as lay in my power, in the grouping here adopted, to take nature for my guide, and so to break up the numerous species into sections which have more or less resemblance to a well-known species which I consider typical of the group. It is far from being satisfactory to myself, and I cannot expect it to be so to others; but I have done my best.

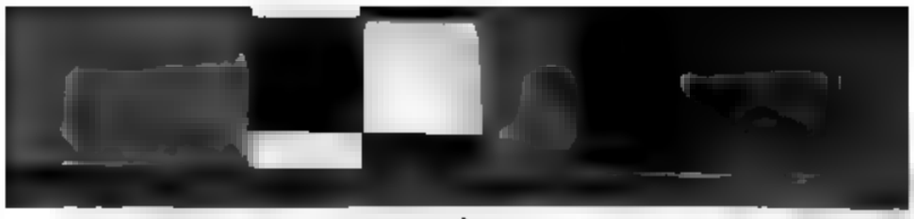
J. Sm.; Kunze next before *A. salignum*, Bl., and remarks, "Species a forma simplici, jam subinde fertili, ternatam, quinato-pinnatam et vere pinnatam, quovis latere pinnis 3–6, percurrit, textura frondis subcoriacea et margine repando-crenulata alata variat." The pinna represented by Mettenius l. c. is larger than the pinnæ of *A. salignum*, not so narrowed towards the base, and wants the callous base of the costa where it unites with the rachis: the veins too are much more numerous and approximate.

35. A. (Euasplenium) *salignum*, Bl.; "frond of two kinds (*fronde difformi*) sterile quite simple, fertile ternate or subquinato-pinnate, pinnæ petiolate linear-lanceolate attenuated at each extremity serrulate submembranaceous and as well as the stipes and rachis glabrous." (TAB. CLXV.) *Bl. En. Fil. Jav. p.* 175 (*not Metten. in Hort. Fil. Lips. p.* 72. *t.* 7, *nor Asplen. p.* 95).—*Kze. in Bot. Zeit.* vi. *p.* 146. "A. serricula, *Fée ?, Gen. Fil. p.* 196" (*Metten.*).

Hab. Shady places, mountains of Java, *Blume*, *in Herb. Nostr.*, *Zollinger*, n. 344 *z.*—My only specimen of this, from the author, is totally unlike what Mettenius figures and describes for *A. salignum*, Bl., but which I think is identical with *A. persicifolium* of J. Sm. The specimen of Blume (here figured) is, however, the pinnated form only. Stipes 4½ inches high, slender, very pale-green, subcoriaceo-membranaceous, opaque, glabrous. Pinnæ seven, 4–5 inches long, lateral ones opposite, distant, from a slightly narrowed or attenuated and cordate base, lanceolate, much acuminated, obscurely serrated, more so at the point, costa rather broad, pale-stramineous, its base much dilated, so as to form a singularly callous kind of petiole between the lobes of the cordate base, terminal pinna the largest, broad at the base and suddenly decurrent so as to form a winged petiole three-quarters of an inch long, veins simple or forked, horizontally patent, distant, sori linear, short, extending from the costa about halfway to the margin, involucres short. Kunze compares it with *A. diversifolium*, Bl., next to which he and Blume place it.

36. A. (Euasplenium) *marinum*, L.; caudex short thick woody crowned with dense glossy purple-brown subulate scales, stipites tufted and as well the greater part of the rachis ebeneous-brown, fronds 3 inches to a span and more long oblong- or broad-lanceolate coriaceo-membranaceous pinnate, pinnæ 1–2 inches long oblong or lanceolate subtrapezoid obtuse sinuato-lobate or serrate the obliquely cuneate base entire, inferior base slightly excised the superior base truncate rarely subauriculate, uppermost pinnæ decurrent, the extreme lobe pinnatifid, sori large oblique oblong often confluent, involucres subcoriaceous, veins obscure forked, rachis winged green above.—*Linn. Sp. Pl. p.* 1540. *Sw. Syn. Fil. p.* 79. *Willd. Sp. Pl.* v. *p.* 318. *Metten. Fil. Hort. Lips. p.* 73. *Asplen. p.* 135. *Schk. Fil. t.* 68. *Sm. Engl. Bot. t.* 392. *Moore, Ferns, Nat. Print. t.* 38. A. trapeziforme, *Huds.*

Hab. Although so common on the rocky coasts of the British Isles as far north as the Orkneys, it is nowhere known as an inhabitant of Germany or Scandinavia



but following the coasts of France and Spain, it extends south to the Canary Islands. It appears in Tangiers (*Gosen in Herb. Nostr.*), on the African coast, and in the western islands of the Mediterranean. I possess specimens from New Brunswick, Nova Scotia, from *Capt. Kendal;* and undoubted specimens from Rio Grande do Sul, Brazil, collected by *Mr. Fox*, and another from St. Vincent, W. Indies, gathered by *Lansdown Guilding*. Though a maritime plant, it is, in England at least, like the *Plantago maritima* and *Armeria maritima*, also occasionally found on mountains remote from the coast. Some of our specimens from Madeira have the fronds more than a foot long independent of the stipes. Though variable in the size of the fronds and even in the form and outline of the pinnæ, sometimes elongated and pinnatifid, it is a species easily recognized, especially by its glossy ebeneous stipes.

36. A. (Euasplenium) *obtusatum*, Forst.; caudex short stout woody subdecumbent densely rooting below and densely paleaceous above with large brown glossy ovate long-acuminated scales (having *Sphagnum*-like cellules), stipites tufted of the same colour as the frond 3 inches to a span long compressed, fronds 6–10 inches long coriaceous very firm "generally pale light-green still paler beneath" slightly paleaceous when young oblong acuminate pinnated with usually a distinct terminal pinna, pinnæ few 2–6 or 7 pairs petiolate 1–2 inches long oblong obtuse (rarely acuminated) obliquely cuneate at the base superior base truncate not auricled crenato-serrated at the elevated and subcartilaginous margin, veins sunk simple or more rarely forked, sori oblique few and short and oblong or linear and more numerous, involucre firm pale-coloured. *Forst. Prodr. p.* 80. *Sw. Syn. Fil. pp.* 78, 267. *Willd. Sp. Pl.* v. *p.* 317. *Schk. Fil. t.* 68. *Br. Prodr. Fl. Nov. Holl. p.* 150. *Labill. Fl. Nov. Holl.* ii. *p.* 93. *t.* 242. *f.* 2. *Hook. fil. Fl. N. Zeal.* ii. *p.* 33. *Homb. and Jacq. Voy. au Pôl. Sud, Bot. Crypt. t.* 1 *B, small specimen (without descript.). Hook. Fil. Exot. t.* 46. *Hook. fil. Fl. Tasm.* 2145. *Metten. Asplen. p.* 92. *Moore, Ind. Fil. p.* 150. A. decurrens *and* A. sarmentosum, *Willd. l. c. p.* 316. A. chondrophyllum, *Bert. Coll. Pl. Chil.* 40. *t.* 68. A. consimile, *Gay, Fl. Chil.* vi. *p.* 501.

Var. *β. obliquum;* larger pinnæ more numerous oblong-lanceolate generally acute darker green, sori narrower more crowded and more linear.—*Hook. fil. Fl. Antarct. p.* 108. *Fl. N. Zeal.* ii. *p.* 33. A. obliquum, *Forst. Prodr. p.* 80. *Sw. Syn. Fil. pp.* 78, 268. *Schk. Fil. t.* 71 (*good*). *Metten. Asplen. p.* 92. *Labill. Fl. Nov. Holl. l. c. t.* 242. *f.* 1. A. sphenoides, *Kze. in Linnæa*, ix. *p.* 63. A. apice-dentatum, *Hombr. et Voy. Pôl. Sud, t.* 1. *f. A, and* A. obtusum, *t.* 1. *f. B, the larger specimen.* A. lucidum, *γ.* obliquum, *Moore, Ind. Fil. p.* 142.

Var. γ. *difforme*; bi-tripinnate, lobes and pinnules obovato-cuneate and incised or linear, sori on the latter marginal.—A. difforme, *Br. Prodr. Fl. Nov. Holl. p.* 160. *Endl. Fl. Norf. p.* 9. *Metten. Asplen. p.* 107. *t.* 4. *f.* 1.

Hab. Southern hemisphere, as far south as Lord Auckland's group and Campbell's Islands, especially New Zealand, N. S. Wales, Tasmania, west coast of S. America, Chiloe and Valdivia, and as far north as Peru. Juan Fernandez, *Bertero*. Pitcairn's Island and Oahu. *Bennett*, *Mathews*, *n.* 22, *Dr. Diell*; from both places some of the specimens almost exactly correspond with the previous species, *A. marinum*. Norfolk Island; on fronds from the same caudex exhibiting the normal form of *A. obtusatum* and perfect *A. difforme*, Br.—Var. β. *obliquum*. N. Zealand, *Forster*, *Menzies*, etc. Lord Auckland's Islands, generally near the sea, abundant, *J. D. Hooker*. Banks's Peninsula, *Dr. Lyall* (pinnæ more acuminate, large, an inch and more broad). Tristan d'Acunha, *Carmichael* (pinnæ more acuminate, deeply excised at the inferior base, sori short). Pacific Islands; Kermadec group, *M'Gillivray*, *Milne*. Sandwich Islands, *Barclay*, *n.* 44 *and* 46, *Seemann*, *n.* 2242, *Dr. Diell*, *n.* 12 (*A. Oahuense*, Diell, MS.): all these specimens are considered by Mr. Moore to be *A. paradoxum*, Blume. Peru, *Poppig* (*A. sphænoides*, Kze.), and Isle of Massa Fuera, *Douglas*. Chili, Talcuahano, *Harvey*. Valdivia, *Lechler* (*A. sphænoides*, Kze.: varying much in size, some specimens quite the normal form of *A. obtusatum*).—Var. γ. *difforme*. N. S. Wales, *Brown*, *Sieber*, *Syn. Fil. n.* 119, *Fl. Mixt. n.* 267; Norfolk Island, etc.

Many of the specimens of this singularly variable Fern would, if seen by themselves, be naturally considered distinct species: and, indeed, nothing but a most extensive suite of specimens from various localities, exhibiting the several intermediate forms, justify me in thus uniting them. With regard to the most opposite in form and character (simply pinnate as is the normal state of *A. obtusatum* and the *A. difforme* of Mr. Brown, with its bi-tripinnate fronds, often too becoming dareoid), my specimens exhibit almost a gradual transition from the one to the other. Mr. Backhouse, too, in his account of Norfolk Island (Narrative of a Visit to the Australian Colonies), observes, "On the rocks of the south coast grows *Asplenium difforme*" (he assuredly means *obliquum* or *obtusatum*) "grows, a Fern resembling the *A. marinum* of England. At a short distance from the shore its leaves become more divided, and in the woods in the interior of the island they are separated into such narrow segments that the lines of fructifications are thrown upon their margins: it then becomes *Cænopteris Odontites* (*Aspl. flaccidum*, Forst.)."—My own numerous specimens of these plants do not quite bear out this assertion: but it is far from improbable, for the sports of Nature among Ferns are quite marvellous.

37. A. (Euasplenium) *scleroprium*, Hombr. et Jacq.; caudex thick short densely scaly, stipites 4 inches to a span high broad compressed furrowed in front, frond 1–1½ foot high pinnated carnoso-coriaceous, pinnæ petiolate patent narrow-lanceolate much and caudato-acuminate, at the base obliquely or unequally cuneate, the lower base subincised the margins deeply serrato-pinnatifid the segments oblong or linear entire or often bi-tridentate at the apex, terminal pinna similar to the lateral ones sometimes more deeply-pinnatifid with segments cuneate and laciniated, veins sunk obsolete, sori linear oblong one to each segment at the inner

margin (dareoid) but extending towards the costa, involucres broad rigid, rachis broad compressed slightly winged above. —*Hombr. et Jacq. Voy. au Pôle Sud, Bot. Crypt. t.* 1 *D.* (*less deeply pinnatifid than some of our specimens*). *Hook. fil. Fl. Antarct.* i. *p.* 109. *Brack. Bot. Voy. U. S. Expl. Exped. p.* 155. *Metten. Asplen. p.* 93. A. flaccidum, *β* Aucklandicum, *Hook. fil. Fl. Ant. p.* 109. A. lucidum, *β* scleroprium, *Moore, Ind. Fil. p.* 142.

Hab. Lord Auckland's Islands, *Hombron and Jacquinot, J. D. Hooker, Brackenridge.*—Dr. Hooker observes that this is common in woods near the sea, where it makes a beautiful appearance by the bright shining green very coriaceous fronds. Hombron and Jacquinot's figure is very characteristic, but neither they nor any subsequent author has offered a specific character: nor do I do so here under any conviction of the species being really distinct, but the difficulty is to say what are its nearest affinities. It has every appearance of being a dareoid (or cenopteroid) state of some *Asplenium* with entire or nearly entire pinnæ. Their long-acuminated points resemble *A. lucidum*: the shorter sori bring it nearer to our var. *obliquum* of *A. obtusatum*; while some of Dr. Hooker's specimens are so deeply divided in the pinnæ and of that peculiar pale colour which render it hardly possible to distinguish it from *Aspl. flaccidum*, Forst., that it is a matter of no surprise he should have considered it an extreme southern state of that species. Nor should I be surprised if future observations confirm this opinion. There is however among Dr. Hooker's specimens of this plant one which cannot be distinguished from the normal form of *A. obtusatum*. We have under the preceding species had to record variations as remarkable as these. Some of our specimens of *A. scleroprium* are darkish-green; others quite brown in the dried state.

38. A. (Euasplenium) *paradoxum*, Bl.; "fronds pinnate membranaceous glabrous rooting at the point, pinnæ shortly petiolate subalternate trapezoideo-oblong acuminate, at the superior base truncato-subauriculate, inferior base abscisso-cuneate unequally repando-crenulate striated, sori remote transverse, stipes and rachis nearly terete furfuraceous." *Bl. En. Fil. Jav. p.* 179.—*Metten. Asplen. p.* 122. Tarachia paradoxa, *Pr. Epim. p.* 260.

Hab. Java, growing on large trees, *Blume.*—Although possessing a specimen of this Fern from Dr. Blume himself, I nevertheless give his character of the species. This specimen is peculiar in some points not mentioned by Blume. The pinnæ are membranaceous, dark-green above, of a dingy rusty-brown beneath: the veins are singularly close and compact, erecto-patent at a very acute angle with the slender costa, consequently very long, and the sori also very long (nearly an inch) and slender, and so far from being "transverse" are almost parallel with the costa: the involucre is very narrow, membranaceous. The length of the pinnæ is 5–6 inches, breadth an inch and a half, obtusely auricled at the base, very finely acuminated. Sandwich Island specimens of what I consider to be *A. obtusatum*, Forst., are marked in my herbarium, by Mr. Moore, as *paradoxum*, Bl.

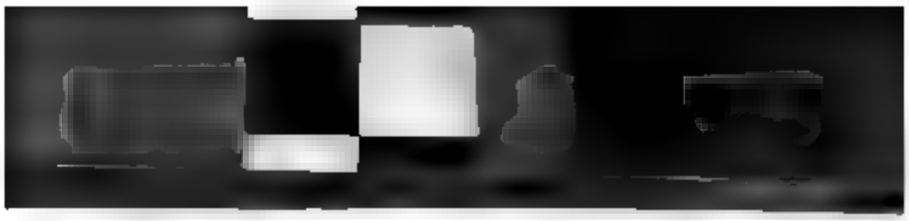
39. A. (Euasplenium) *lucidum*, Forst.; caudex short thick woody paleaceous with copious imbricated ovate long-acu-

minated satiny reticulated scales, stipites semiterete or much compressed and broad a span to a foot and more long, fronds often 2 feet long and a foot broad pinnated with a terminal pinna, pinnæ all petiolate 5–7 to 15 or more subcoriaceous sometimes fleshy patent elliptico-ovate or oblong-lanceolate acuminate generally finely so and subcaudate more or less (often strongly) serrated, superior base rounded inferior base obliquely incised, the margin thickened, veins conspicuous, sori numerous linear elongated in close parallel oblique lines with narrow white involucres of a firm texture. (Young plants more or less scaly.)—*Forst. Prodr. p.* 80. *Schk. Fil. p.* 66. *t.* 72. *Hook. Fl. N. Zeal.* ii. *p.* 33. *Fl. Tasm.* ii. *p.* 146.—Var. *β. paucifolium*, dwarf, pinnæ 3-7, terminal one much elongated.—Var. *γ. Lyallii;* inferior pinnæ pinnated at the base, intermediate ones lobed and deeply so, especially at the superior base. *Hook. fil. Fl. N. Zeal. p.* 33. *t.* 77. A. Lyalli, *Moore, Ind. Fil. p.* 143.

Hab. New Zealand, abundant, *Forster, and all succeeding botanists.* The pinnæ even in the more normal state vary extremely in form and in size: many of them are 6 inches long and 2 inches and more broad, others are equally long and narrow-lanceolate. One specimen has on the lowest pinnæ the upper base extended into an auricle an inch long; another specimen has two acuminated auricles nearly 2 inches long; generally those with the narrower pinnæ are the more thick and fleshy. Norfolk Island, *Dr. Vaughan Thomson.* Pacific Islands, Owhyhee, *Menzies.* Sunday or Raoul Island, Kermadec group, *Mibe and M'Gillivray* (our specimen with pinnæ very large and quite obtuse).—Var. *β.* N. Zealand, *Colenso;* this has a very peculiar appearance, is of a singularly dry and coriaceous texture, 6–8 inches high, yet fully fructified, with the terminal pinnæ much elongated, and the copious sori generally resembling those of *A. lucidum*, but in most of the specimens the lateral pinnæ are quite short.—Var. *γ*, Otago, Middle Island, N. Zealand, *Dr. Lyall*, has the lower pinnæ again pinnate and sometimes the upper ones also, so as to be thus bipinnate throughout: in the same way as we have described *A. obtusatum* to do, when it constitutes the *A. difforme* of Brown.

Mr. Moore, in his 'Index Filicum,' differs from us in his views of this Fern and the allied kinds, *A. obtusatum* and *A. obliquum*, all considered distinct species by their first discoverer, Forster; and these three are well represented, as to their normal state, by Schkuhr and Labillardière. Moore unites *A. obliquum* with *A. lucidum*, and he may be right; but I think the former has much more affinity with *A. obtusatum* (*verum*) than with the latter: and if they could be carefully studied in their native localities, the probability is we should find it needful to unite the whole group. The copious scales of the caudex are formed of the most delicate membrane, reticulated as in the leaves of *Sphagnum:* but instead of being white like them, they are glossy and even iridescent. The caudex is singularly thick woody for so small a Fern, and as large in the case of our dwarf var. *β* as in our finest and largest specimens.

40. A. (Euasplenium) *gemmiferum*, Schrad.; caudex subrepent or declined stout densely clothed with long woolly



radicles the summit moderately clothed with lanceolate sphagnoid scales, stipites tufted 6–12 inches long often compressed pale, fronds 1–2 feet long ovate or oblong-lanceolate impari-pinnate submembranaceous often thicker and subcarnoso-coriaceous, at the apex generally having a proliferous gemma, pinnæ 4–6 inches long oblong-lanceolate generally much acuminate the margin subincrassate usually entire sometimes more or less serrated petiolate the base unequally cuneate the upper base rounded, terminal one generally large long-petioled, veins conspicuous distant, sori copious but distant oblique sometimes slightly falcated linear-oblong commencing close to the costa never approaching the margin, involucres pale firm-membranaceous, rachis more or less compressed and subulate above.—*Schrad. Gött. Gel. Anz.* 1818, *p.* 916. A. lucidum, *Schlecht. Adumbr. Fil. p.* 25. *t.* 14 *A. Metten. Asplen. p.* 93. *Pappe and Rawson, Syn. Fil. Afr. Austr. p.* 17. *Moore, Ind. Fil. p.* 34.—Var. *β. discolor;* dareiform, pinnæ pinnatifid often to the costa pale beneath segments oblong or generally cuneate emarginate or bifid, sori never at the margin but on the disc next the rachis:—a subvariety of this is sent by Messrs. Pappe and Rawson, with the base of the lower pinnæ pinnate, superior ones slightly lobed, the lobes emarginate, terminal pinnatifid, pinnate in its lower half.—A. lucidum pinnatifidum, *Schlecht. Adumbr. Fil. p.* 25. *t.* 14 *B. Schrad. Gött. Gel. Anz.* 1818, *p.* 916. *Moore, Ind. Fil. p.* 131. *Pappe and Raws. l. c. p.* 51. A. discolor, *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 17. Darea flaccida, *β, Hook. et Arn. Bot. Beech. Voy. p.* 107.

Hab. South Africa, Cape of Good Hope, *Bergius, Zeyher*, n. 4628, *Drège, Villette, etc.*, to Natal, *Major Garden.*—Var. *β.* South Africa, *Krauss.* n. 747, *Villette, Carmichael* (Darea hybrida, *Carm. MS.*). Knysna, Distr. George, *Miss Dalgairns.* Bourbon, *Carmichael, in Herb. Nostr.;* this, like Pappe and Rawson's specimen above noticed, exhibits two forms—one the ordinary state of this variety; the other is copiously bipinnate, the pinnæ less obtuse or retuse. Oahu, in the Sandwich Islands, *Beechey:* the segments longer and deeper, sori very frequently marginal (dareoid).—I had been formerly disposed to unite this, as Schlechtendal had done, with *A. lucidum*, to which indeed it is very closely allied; and it is subject to the same variations. But the caudex, wherever that is present, never forms so thick and erect a rhizome, its scales are much less copious, less membranaceous and glossy, the pinnæ are generally more membranaceous, and the veins and sori more distant but more approximate to the margin. The two states are well represented by Schlechtendal. In this and its allies the stipes and rachis are more or less deciduously chaffy. Schlechtendal refers the *Aspl. virens* of Presl, from Guayaquil, here, which we preserve as distinct.

41. A. (Euasplenium) *emarginatum*, Beauv.; fronds 1½–2

feet long ovate long-acuminate pinnate membranaceous dark-green paler beneath, pinnæ 7–9 remote lateral ones 5–6 inches long petiolate oblong-lanceolate suddenly caudate, cauda an inch and more long with a scaly gemmiferous bud near the apex (on the falling away of this proliferous caudex the apex of the pinna then becomes emarginate) obliquely cuneate at the base, superior base the most rounded, the margin obscurely sinuato-crenate, terminal pinna more petiolate exceedingly long and much acuminate sometimes much sinuated proliferous at the caudate extremity, veins distant, sori distant narrow elongate remote from the rachis and extending almost to the margin, involucres membranaceous very fugacious.—*Beauv. Fl. d'Oware et de Benin*, ii. *p.* 6. *t.* 61. *Metten. Asplen. p.* 94.

Hab. Mountains of Isle du Prince, Bight of Benin, *Palisot de Beauvois.* Tropical Western Africa, south of the Line, *Dr. Curror.*—This is a very distinct *Asplenium*, in its lateral pinnæ much allied to *A. gemmiferum*, but in their perfect state the elongated terminal pinna is suddenly contracted at the apex into a linear proliferous cauda, an inch long, In our two specimens the terminal pinna is almost thrice as long as the lateral, gradually acuminated almost from the base, but still terminated by the caudate apex, proliferous with young fronds and roots. Where our pinnæ are emarginate, it appears to be caused by the falling away of the proliferous apex, which perhaps again bears a gemma as represented by Palisot de Beauvois. It appears to be a rare species, probably not seen by Mettenius, or he would hardly have said, "Ab antecedente" (*A. Prionitis*, Kze.), "cui proximum, fortasse non pro specie diversum."

42. A. (Euasplenium) *virens*, Pr.; stipites a span to a foot long furrowed in front slightly scaly at the very base, fronds a foot long subovate rather thick subcarnoso-membranaceous dull yellowish-green paler beneath impari-pinnated, pinnæ 9–11 3½–4 inches long patent petiolate distant oblong- rather broad-lanceolate acuminate often finely so duplicato- and sharply serrated the base equally cuneate and tapering into the rather long petiole subpellucid, veins very distinct when the pinna is held against the light erecto-patent once or twice forked, sori linear elongated copious sometimes an inch long extending from near the costa almost to the margin.—*Presl, Reliq. Hænk. p.* 41. *t.* 6. *f.* 3. *Metten. Asplen. p.* 93.

Hab. Guayaquil, *Presl.* Gorgona Island, tropical west coast of America, *Hindes.* —Var. *minor*; sterile, pinnæ smaller, shorter and less serrated.—This I am disposed to consider a good species, very correctly represented by Presl, l. c. Our specimens are much finer than Hænke's. The pinnæ are of a thin, soft, yet somewhat fleshy-membranaceous consistence, of a dull, lurid yellow-green, yet subtranslucent when held between the eye and the light, very uniform in the two halves (not obliquely lanceolate or dimidiate), strongly serrated, with copious long lines of sori.

43. A. (Euasplenium) *Prionitis*, Kze.; caudex "creeping paleaceous with long membranaceous fuscous shining ovate much acuminated scales," stipes 6 inches or more long, frond broad-ovate a foot or more long impari-pinnate subcoriaceous, pinnæ 4–5 inches long petiolate oblong- or ovato-lanceolate acuminate (lowest pair abbreviated) superior base truncate inferior inciso-cuneate deeply sharply and irregularly serrated, terminal one petiolate rather longer than the rest, veins distant, sori distant oblique linear-oblong neither extending to the costa nor to the margin, involucre pale firm. —*Kze. in Linnæa*, x. *p.* 511. *Pappe and Rawson, Syn. Fil. Afr. Austr. p.* 17. *Metten. Asplen. p.* 94. *t.* 4. *f.* 19 (*pinna only, excellent*).

Hab. South Africa, Natal, *Drége*, *Pappe and Rawson*.—Allied, as Kunze observes, to *A. gemmiferum*, but apparently distinct. The lowest pair of pinnæ is dwarfed, shorter indeed but equally wide with those above, and their form is subrhomboidal deeply excised at the inferior base. I have only two specimens I can certainly refer to this species, one the lower part of a large frond, named by Kunze; the other more perfect one is from Dr. Pappe. The deep sharp serratures are among its more distinguishing features; but it requires a greater number of specimens to enable me to feel satisfied that it is a genuine species. Some individuals of *A. anisophyllum* have great affinity with it.

44. A. (Euasplenium) *vulcanicum*, Bl.; caudex "erect 1½ inch in diameter thickly clothed with membranaceous brown ovate acuminated scales 6–8 lines long," petiole pale 6–8 inches long compressed, fronds 1–2 feet long pale-green coriaceo-membranaceous impari-pinnate, pinnæ petiolate often proliferous in the axils 4–6 inches long lanceolate finely acuminate entirely or obscurely serrated more distinctly towards the apex the base, nearly equally cuneate, veins simple and forked very patent, sori numerous linear near the costa but remote from the margin, involucre pale firm-membranaceous.—*Bl. En. Fil. Jav. p.* 176. *Metten. Asplen. p.* 94. *t.* 4. *f.* 2.

Hab. Java, *Blume* (summit of the volcanic mountain Gede), *Thos. Lobb*, *Zollinger*, *n.* 2106.—A graceful Fern, of a delicate whitish-green colour. Most of my specimens have the pinnæ entire or nearly so. Mettenius's figure, from Zollinger's plant, represents much stronger serratures than I have seen, and he describes the veins as undivided, whereas he observes, "In descriptione Blumeana satis congrua nervi dicuntur furcati." Also he speaks of the sori on the pinnæ as "fere ad basin dentium continuati;" and of the pinnæ being proliferous below the apex. In all my specimens, including one from Dr. Blume, the veins are copiously forked, the sori do not approach the margin, and the proliferous gemma is always axillary. Probably Mettenius's plant is something different.

45. A. (Euasplenium) *multilineatum*, Hook.; stipes a span

or more long dark lurid-brown, frond a span to a foot and more long impari-pinnate subcoriaceo-membranaceous dark-green above paler beneath, pinnæ 11–19 spreading rather moderately distant 4–6 inches long petiolate narrow-oblong caudato-acuminate very obscurely and unequally toothed the apex serrated the base obliquely cuneate, terminal one rather larger and more petiolate, veins subhorizontally patent close uniform simple or very rarely indeed forked at the base terminating at the margin with acute (not clavate), all (or very nearly all) soriferous except in the caudate apex, sori narrow forming a multitude of horizontal brown narrow lines extending from the costa to the margin, involucres at first membranaceous then contracted and rigid. (TAB. CLXXXIII.)—Asplenium distans, *Brack. Fil. U. S. Expl. Voy. p.* 155, *not of Don or of Fée. Mr. Moore changes the name to* A. remotum *in his Ind.Fil. p.* 125, *which he would hardly have done if he had seen the plant. Metten. Asplen. n.* 29 *B.*

Hab. Navigators' Islands, *Brackenridge*. Feejee Islands, *Milne*.—There can be no question of this Feejee Island Fern being the same as the one from the adjacent Navigators' Islands, which Mr. Brackenridge has called *A. distans*—a not very appropriate name, even if it were not preoccupied. That botanist was at a loss to determine the affinity of this plant. Among the true *Asplenia* it may rank next to *vulcanicum*, but the form and texture and colour of the pinnæ and the shorter and more distant less horizontal sori of the latter and the more general forked venation readily distinguish it. It comes perhaps in many respects nearer to Blume's *Aspl. pallidum* (*A. calophyllum*, J. Sm.), but that is truly a diplazioid Fern, sometimes altogether so, and the venation is more branched. The sori, though very close, do not appear to become confluent in our specimens, as described by Brackenridge.

46. A. (Euasplenium) *prionurus*, J. Sm.; caudex a short thick hard rhizome with copious woolly roots and above a few firm lanceolate acuminated scales, stipites tufted a span to a foot high slightly scaly pale-brown, fronds a span to 18 inches long ovate coriaceo-membranaceous dark-green above pale beneath pinnated, pinnæ rather distant 5–6 inches long very patent petiolate 10–18 pairs narrow-lanceolate long and gradually acuminated, the base obliquely cuneate deeply and regularly inciso-serrate the teeth longer and more distant on the acumen, veins approximate mostly simple, sori copious linear oblique parallel extending from the costa to the base of the serratures, involucres firm pale-coloured.—*J. Sm. in Hook. Journ. Bot.* iii. *p.* 408 (*name only*). *Metten. Asplen. p.* 97.

Hab. Luzon, *Cuming*, n. 197.—This has the appearance of a distinct species,

and it certainly is a very handsome one. It approaches nearest to the normal form of *A. lineatum*, Sw., having the same general colour of frond and the same copious parallel lines of fructification: but the much larger size of the frond, the very elongated and singularly acuminated pinnæ, with the very deep and regular serratures, will readily distinguish it.

47. A. (Euasplenium) ***lineatum*, Sw.**; (normal form) caudex thick erect or decumbent knotted paleaceous above with brown lanceolato-acuminate scales, smaller and deciduous ones more or less invest the stipes and rachis, stipites tufted mostly terminal on the caudex 6 inches to a foot long lurid-green or purplish, fronds 1–2 feet long lanceolate acuminate impari-pinnate coriaceo-membranaceous dark-green paler beneath, pinnæ patent or horizontal petiolate from a broad obliquely cuneate base gradually tapering into a long acuminated more or less deeply and coarsely serrated apex, superior base often truncated, veins approximate forked patent, sori linear copious in parallel lines from the rachis to the margin (or nearly so) and generally occupying all the broader portion of the pinna, involucres narrow brown membranaceous.—*Sw. Syn. Fil. p.* 77, 262. *Willd. Sp. Pl.* v. *p.* 314. *Metten. Asplen. p.* 97. 31 *b.* A. nodulosum, *Klfs. in Sieb. Fil.* 69 *and* 301. *Metten. Asplen. p.* 96. *t.* 4. *f.* 3. A. plumosum, *Bory, in Willd. Sp. Pl.* v. *p.* 323, *and* Diplazium lineatum, *Pr. Tent. Pterid.* p. 113 (*fide Moore*). A. "*an* obliquum, *Sw.?*" *Wall. Cat. n.* 2217? (*proliferous from small gemmæ on the rachis of the pinnæ, otherwise sterile*).—Var. *β. bipinnatum*; pinnæ again pinnated, pinnules linear or linear-cuneate entire or unequally bi-trifid at the apex.—Darea inæqualis, *Willd. Sp. Pl.* v. *p.* 298. *Fée, Gen. Fil. p.* 332. *t.* 27 *C. f.* 1. Aspl. inæquale, *Kze. Bot. Zeit.* vi. *p.* 176, *in obs. on* Cænopteris furcata, *n.* 238. Darea bifida, *Klfs. in Sieb. Fil. n.* 56. Aspl. nodulosi *formæ a et b, Metten. Asplen. p.* 97. *t.* 4. 4–7. Darea intermedia, *Klfs. in Sieb. Fil. n.* 56. *Bory, in Bel. Fil. p.* 55. D. bifida, *Klfs. in Sieb. Fil. n.* 56. *Moore, Ind. Fil. p.* 137.—Var. *γ. bifido-furcatum*; pinnules deeply bifid or pinnatifid with 4–6 linear segments.—A. inæquale, *β* bifido-furcatum, *Moore, Ind. Fil. p.* 137. Aspl. nodulosum, *forma c, Metten. Asplen. p.* 97. *t.* 4. *f.* 8, 9. Darea bifida, *Bory, in Bel. Voy. Bot. p.* 54.

Hab. Mauritius and Bourbon, *Bory, Bojer, Sieber, Wallich, Bouton, Gardner, and others*, apparently abundant in the normal state, as are the above varieties.—It was the accurate Kunze who, in 1835, announced the fact that he had seen a specimen of *Asplenium nodulosum*, Klfs. (A. lineatum, *Sw. et nobis*) with the lower pinnæ altogether, and the superior at the base, "dissected," and passing

into a *Cenopteris*, or in other words becoming *Darea bifida*, Klfs. But authors in general are indisposed at present to credit such singular transformations. My own very copious specimens prove it beyond the shadow of a doubt. I possess the two forms from one and the same caudex, and specimens with pinnæ which are simple and again pinnate on the same individual frond. Mettenius, in his Monograph of *Asplenium*, has admirably illustrated the most striking forms by figures. In the bipinnate state the rachis of the pinnæ is sometimes proliferous from small gemmæ, or buds; the infant fronds are cuneate and incised at the apex: in many respects bearing a close affinity to Brackenridge's *A. enatum*.

The nearest ally of the normal form of this species is perhaps with *A. pellucidum*, Bl., but the very coriaceous nature of the fronds, and the peculiar colour when dry, induce me to refer this latter to the *Furcatum*-group. I am doubtful if I am correct in referring "Wallich's n. 2217?" hither: the frond is thin and membranaceous, sterile, and the costæ of the pinnæ above bear numerous small spathulate fronds from scaly gemmæ. I possess the same form from Bourbon, gathered by Carmichael.

48. A. (Euasplenium) *Mascarenhense*, Fée; "fronds pinnate lanceolate, stipes and rachis sulcate brown, pinnæ lanceolate long-acuminate semiserrate remotely serrate at the point cuneate at the base ending in a petiole below, slightly emarginate, sporothecia long linear, indusium narrow, sporangia ferruginous-red, pedicel slender, annulus 18–20-articulated, spores small ovoid." *Fée, Gen. Fil. p.* 194.—*Metten. Asplen. p.* 96.

Hab. Bourbon, *Dubrisson* (*Fée*). Mauritius, *Pappe* (*Mettenius*).—It is to be regretted that neither Fée nor Mettenius (who has given a more full specific character of this plant than Fée) offers any observations on its affinity. May it not be the same as *A. lineatum*, Sw. (normal form)? close to which both Fée and Mettenius place it, though the latter does not seem disposed to acknowledge *A. lineatum* and *A. nodulosum* to be the same, and he adopts the latter name for what we consider true *lineatum*, Sw.

49. A. (Euasplenium) *Wightianum*, Wall.; caudex small subrepent rooting scaly above, stipites tufted a span or more high, fronds a foot and a half to two feet long ovate-lanceolate coriaceous pale-whitish-green, pinnæ distant petiolate erecto-patent 4–6 inches and more long elongato-lanceolate subglossy rather coarsely but not deeply serrated much and gradually acuminated entire at the apex the base narrow and equally cuneate (gradually decurrent into the petiole), veins mostly forked approximate, sori erecto-patent linear extending from the costa but not to the margin, involucre firm white and the same white colour and texture extends to the vein or as much of it as is occupied by the involucre, rachis compressed scarcely winged. (Tab. CLXVII.)—*Wall. Cat. n.* 2215. A. coriaceum, *Bory, in Bel. Crypt. p.* 46 (*fide Moore, not Fée*).

Hab. Madras Peninsula, *Wallich, n.* 2215, *Wight, Herb. Propr. n.* 98. Ceylon,

Gardner, n. 1070. Dindigul, *Belanger*.—This is a more slender and graceful Fern than *A. Prionurus*, J. Sm., with more distant pinnæ of a much paler colour and more coriaceous and glossy texture, much narrower at the base (tapering at both ends) equally and narrowly cuneated at the base, much less strongly serrated, shorter and more distant sori, which are much less conspicuous on the pale fronds than on those of *A. Prionurus*.

50. A. (Euasplenium) *longipes*, Fée; "fronds quite glabrous ovate and as well as the stipes rachis and petiole of the pinnæ reddish-yellow (*helveole*), pinnæ ovato-lanceolate long-petioled acuminate acute at the base the margins crenato-dentate, veins thick simple not extending to the margin proliferous in the middle, sporothecia rather long diminishing from the base towards the apex, sporangia ovate, pedicel slender very long articulated, spores ovate." *Fée, 7me Mém. Foug. p.* 49. *t.* 16. *f.* 3.—*Metten. Asplen. p.* 95.

Hab. "Ceylon, *Col. Walker* (*in Herb. Graham.*)."—Although rich in the Ferns of Ceylon collected by Colonel and Mrs. Walker, I find none I can satisfactorily refer to this plant, which, judging from the figure, resembles small specimens of *A. vulcanicum*, Bl., or it may be an indifferent specimen of *A. Wightianum*, Wall.

51. A. (Euasplenium) *enatum*, Brack.; "stipes smooth angled, fronds glabrous pinnate, pinnæ petiolate alternate distant membranaceous oblong-lanceolate unequally serrated obliquely cuneate at the base, rachis and costa proliferous, sori oblique remote, involucre narrow-linear entire." *Brack. Fil. U. S. Expl. Exp. p.* 153. *t.* 21.—*Metten. Asplen. p.* 100.

Hab. Kaala Mountains, Oahu, Sandwich Islands, *Brackenridge*.—This Fern is unknown to me. Fronds, as represented in the figure, a foot and a half long, proliferous at the apex; pinnæ with much of the form of *A. salicifolium*, but peculiarly straight, not in the least falcate, gemmiferous and proliferous on the superior side of the costa, a little distant from the base. In many respects it resembles our proliferous form of *A. lineatum*, and the author places it next to *A. protensum*,* Klfs. (not Schrader), a species unknown to most botanists, and remarks that *A. enatum* is very distinct from it in the membranaceous and serrate pinnæ, broader at the base, with a proliferous costa, and that its affinity is perhaps closer to *A. obliquum*, Forst.

52. A. (Euasplenium) *alpestre*, Bl.; "frond pinnate coriaceous glabrous, pinnæ alternate subsessile linear-lanceolate acute obliquely rotundate at the base subauriculate serrulate

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* *A. protensum*, Klfs. (not Schrad.); "fronds pinnate; pinnæ lanceolate, attenuate, serrated; superior base rotundato-, inferior abscisso-cuneate, petiolate; petiole compressed, decurrent," *Klfs. Enu. Fil. p.* 167; *Metten. Asplen. p.* 176.—Hab. Oahu, Sandwich Islands, *Chamisso*.—Mettenius places it among the diplazioid *Asplenia*, but he does not appear to know the species.

furcato-venulose, sori transverse, rachis and stipes sparsely setose." *Bl. En. Fil. Jav. p.* 176.—*Metten. Asplen. p.* 97.

Hab. Loftiest mountains of Java, *Blume*.—"Resembling *Aspl. nodulosum*, Klfs. (A. lineatum, *Sw. et nobis*), which differs in the pinnæ being obliquely cuneate at the base, and the rachis subgeniculate," *Bl.*

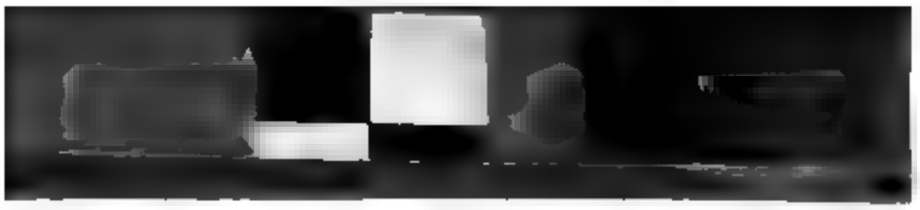
53. A. (Euasplenium) *heterodon*, Bl.; "caudex erect clothed with ovate obtuse scales, petiole sulcate above and evidently margined with the decurrent segments sparingly paleaceous at length glabrous, frond 1–2 feet long coriaceo-membranaceous deep-green ovate pinnated, pinnæ petiolate 8–10 pairs, 2–3 inches long 8 lines to 1 inch wide sparingly clothed with appressed substellated scales, from an unequally cuneate base (the inferior excised) superior decurrent subrhombeo-lanceolate, the apex long-acuminate unequally dentato-serrate, veins oblique evident forked above, sori all costate elongated evidently distant from the margin, involucre membranaceous entire plane." *Mett.*—A. heterodon, *Bl. En. Fil. Jav. p.* 179. *Metten. Fil. Hort. Lips. p.* 72. *t.* 8. *f.* 1, 2. *Metten. Asplen. p.* 95.

Hab. Parasitic on trees. Java, *Blume*.—This has broader pinnæ and fewer sori than *A. vulcanicum*, and the habit is much stouter and more rigid. Blume compares it with *A. macrophyllum*, Sw., *A. salicifolium*, L., and *A. lineatum*, Sw. I have never seen an authentic specimen, but a cultivated one from Java, sent to me by Miquel under that name, is evidently *Aspl. vulcanicum*, having the same copious long sori.

54. A. (Euasplenium) *viviparum*, Bl.; "frond pinnate subcoriaceous glabrous rooting at the apex, pinnæ alternate shortly petiolate narrow-lanceolate acuminate unequally attenuated at the base serrulate from the middle to the apex, veins parallel, sori parallel approximate, stipes and rachis subterete glabrous." *Bl. En. Fil. Jav. p.* 176.—*Metten. Asplen. p.* 95.

Hab. On trees in woods. Java, *Blume*.—"From *Aspl. nitidum* (*lucidum?*), Forst., this differs as well in the size of the frond as in the cuneate and not attenuated base of the pinnæ."—It is quite impossible to determine species of the larger genera by such meagre characters as the above.

55. A. (Euasplenium) *oligophyllum*, Klfs.; caudex short thick paleaceous above, stipites a span to a foot long broadly canaliculate in front scaly below, frond 1–2 feet long dark bright-green coriaceo-membranaceous impari-pinnate, pinnæ seven to fifteen 6–7 inches long (terminal one the largest) petiolate all oblong-lanceolate acuminate nearly equally cuneate at the base entire or obscurely crenato-serrate, petiole decur-



rent so as to form a wing to the depressed rachis, terminal pinna long-petiolate, veins forked rather distant, sori moderately patent linear contiguous to the pale costa, involucres pale-green membranaceous broad.—*Kaulf. En. Fil. p.* 166. *Metten. Fil. Hort. Lips. p.* 72; *Asplen. p.* 95.

Hab. Brazil, *Chamisso*. Gangonoco, in Minas Geraes, *Gardner*, n. 530. Organ Mountains, *Gardner*, n. 173 (pinnæ narrower). Venezuela, *Fendler*, n. 326. Ocaña, N. Granada, *Schlim*, n. 308, *and* 639.—This appears to be a distinct, yet not much known, species. In size and form of pinnæ there is some resemblance to *Aspl. lucidum*, but it differs in many respects.

56. A. (Euasplenium) *Walkeræ*, Hook.; glabrous, stipes a span high and as well as the flexuose rachis compressed, frond impari-pinnate 1½–2 feet high, brownish-green when dry pinnated, pinnæ rather long petiolate (petiole ½ to an inch long) remote broad-lanceolate submembranaceous much and finely acuminated deeply and coarsely serrated, the long apex inciso-serrate, the base obliquely cuneate, superior base rounded inferior obliquely and moderately excised, terminal pinna sometimes with 2 cuneate pinnules at the base, veins distinct remote patent simple or forked all soriferous, sori linear broad contiguous to the costa but not extending to the margin, involucre broad brown membranaceous sometimes diplazioid and this second involucre smaller than the other, opening towards that on the next vein below (consequently also scolopendrioid). (Tab. CLXIII.)

Hab. Ceylon, *Mrs. General Walker*.—Mr. Moore has marked this in my herbarium as *Aspl. vulcanicum*, Bl. (from Java), but it is undoubtedly quite distinct from that species: at once distinguished by its different colour, thinner texture, by the broader form and the very coarsely-serrated pinnæ, and by the very inciso-serrated acuminated point.

57. A. (Euasplenium) *Labillardieri*, Kze. in Mett.; "membranaceous tender glabrous, petiole livid narrow-margined, frond 1¼ foot long ovato-oblong impari-pinnate, pinnæ 12–15 pairs obliquely patent 4–5 inches long 8–9 lines wide, from an entire base below cuneate above broader cuneato-rotundate elongato-oblong rarely ovato-lanceolate acuminate very slightly remotely crenulato-serrulate, veins translucent 1½ line distant standing at an angle of 45° simple or generally forked at the base, sori distant narrow 4 5 lines long approaching nearer the margin than the costa, involucre tender narrow, 'manifeste in parenchyma productum.'" *Metten. Asplen. p.* 95. *t.* 4. *f.* 11 (*single pinna only*).

Hab. Isle of Bourbon, *La Billardière*.—Mettenius places this in his arrange-

ment next to *Asplenium oligophyllum*. It is a species with which I am unacquainted.

58. A. (Euasplenium) *persicifolium*, J. Sm.; stipes and rachis livid slightly scaly, frond 2 feet and more long subcoriaceous ovato-lanceolate very opaque dark-green impari-pinnate or terminated by a viviparous scaly bud, pinnæ numerous yet distant (20–30) patent 4–6 inches long petiolate narrow-oblong lanceolate finely acuminate sometimes subfalcate more or less serrated the apex deeply inciso-serrate the base obliquely cuneate superior rounded or subtruncate inferior subexcised, veins sunk obscure usually forked, sori linear remote rather short patent often irregular not reaching to the costa nor the margin, involucre linear firm-subcoriaceous.—*J. Sm. in Hook. Journ. Bot.* iii. *p.* 408 (*name only*). *Metten. Asplen. p.* 97. A. Zenkerianum, *Kze. in Linnæa*, xxiv. *p.* 259.—Var. *latifolium*; pinnæ and sori broader, superior base of the pinnæ almost truncated. A. salignum, *Metten. Fil. Hort. Lips. p.* 72. *t.* 7 (*excellent*); *Asplen. p.* 95 (*and he brings under it* A. Serricula, "*Fée, Gen. Fil. p.* 196?" var. with secondary veins all undivided). A. salicinum, *J. Sm. in Hook. Journ. Bot. p.* 97 (pinnæ narrow, 6 inches and more long, neither rachis nor pinnæ proliferous). Var. *β. atrovirens*; dark-green, rachis almost black proliferous and rooting at the extremity, pinnæ broader mostly quite entire.

Hab. Luzon, *Cuming*, n. 125, (rachis proliferous at the apex). Nilghiri, *Schmidt*, *Gardner*.—Var. *latifolium*. Ceylon, *General Walker*, *Gardner*, *Thwaites*, n. 361. Isle of Bohol, Philippines, *Cuming*, n. 348 (salicinum, *J. Sm.*).—Var. *β. atrovirens*. Gondalou Island, Solomon's group, S. Pacific, *Milne*, n. 557.—This, and its allied species with large pinnated fronds and willow-leaved-like pinnæ, are extremely difficult of determination, and unfortunately figures, except on a very large scale, such as are quite unsuited to these volumes, would be of very little help, so varied are the forms of the pinna in the different varieties, and even upon one and the same specimen. Mettenius has, I think, correctly united J. Smith's *A. salicinum* with the *A. persicifolium* of the same author.

The figure given by Mettenius of his *A. salignum* (not Bl.), and which is from Ceylon (not Java), gathered by *Gardner*, admits of no doubt of its being a large form of *A. persicifolium*.

59. A. (Euasplenium) *vomeriforme*, Hook.; glabrous, stipes erect a span long and as well as the rachis compressed, frond impari-pinnate 1½ foot long, the pinnæ gradually smaller upwards, petiolate horizontal subcoriaceo-membranaceous pale-brown when dry opaque from a broad base triangulari-oblong or ovate acute rather than acuminate quite entire, superior base truncated parallel with the rachis scarcely forming an

auricle, inferior obliquely truncated subparallel with the rachis, petiole short very pale coloured singularly deflexed compressed subdecurrent, veins immersed nearly all forked distant, sori erecto-patent linear contiguous to the depressed and obscure costa but not extending to the margin, involucres firm subcoriaceous. (TAB. CLXII.)—A. Mathewsii, *Moore, MS. in Herb. Nostr. and Ind. Fil. p.* 145.

Hab. Peru, *Mathews, n.* 1851.—Of this well-marked species I possess a solitary specimen from its discoverer, but that is perfect, only wanting the caudex. The whole frond is of a peculiar pale brown colour when dry, and the texture is remarkable, quite even on the upper surface, opaque, the veins so sunk as to be obsolete, and the costa even in no way elevated. Still more singular are the short, deflexed, compressed, coriaceous petioles, dilated or decurrent at the base (above and below), so as to form a short wing on the rachis. The superior pinnæ are gradually smaller, the terminal one has a large auricle on one side at the base.

60. A. (Euasplenium) *Sumatranum*, Hook.; stipes a span and more long, erect stout compressed furrowed, frond 1½ foot long very rigid coriaceous glabrous impari-pinnate, pinnæ 13 (in our specimen) distant erecto-patent 6–7 inches long lanceolate obtusely acuminate obscurely serrated tapering gradually and equally, at the base sessile and decurrent for some way and forming a coriaceous wing on the rachis, upper ones confluent by means of the wing, ultimate pinnæ larger than the rest, veins sunk obscure erecto-patent simple and forked, sori long linear but unequal, most of them at a distance from the costa and extending to the margin, involucre membranaceous, rachis partially winged. (TAB. CLXVIII.)

Hab. Sumatra, *Teschemacker, in Herb. Nostr.* – A very distinct species, of which I have seen only the solitary specimen in my herbarium. It is remarkable for its thick and coriaceous texture, turning brown in drying, and for the attenuated base of the pinnæ, which become decurrent, the upper ones so much so as to form a wing which unites the pinnæ, while in the rest it only forms a decurrent margin between each pair of pinnæ.

61. A. (Euasplenium) *cultrifolium*, L.; "fronds pinnate, pinnæ falcate lanceolate inciso-serrate with an angle at the base below" ("deorsum angulatis," *L.*; "lowest ones auricled above," *Sw.*). *Linn. Sp. Pl. p.* 1538.—*Sw. Syn. Fil. p.* 78. *Willd. Sp. Pl.* v. *p.* 311. Lonchitis latifolia, etc., *Plum. Fil. p.* 45. *t.* 59? *Metten. Asplen. p.* 98. Diplazium cultrifolium, *Moore, Ind. Fil. p.* 122.

Hab. Martinique, *Plumier.*—Linnæus founded this species upon Plumier's (probably exaggerated) figure above quoted, a West Indian Fern, which no one seems to have since recognized with anything like certainty, unless it be Mr. Moore, who refers it to the genus "*Diplazium* (*D. cultrifolium*)." Roxburgh's

Amboyna *A. cultrifolium* has probably nothing to do with this.* The caudex, in Plumier's plant, is represented as decidedly creeping, and in that respect, as well as in some of the pinnæ having a very distinct, sharp auricle, the plant not inaptly resembles *A. riparium* of Liebmann.

In my herbarium, Mr. Moore has inscribed three Ferns as belonging to *Aspl. cultrifolium* of Linnæus: one is "Aspl. salicifolium," *Sieber*, *Fl. Mixta*, from Martinique, n. 346; and specimens from Jamaica, *Dr. Wright;* from *Purdie*, Trinidad, n. 3; and I have besides specimens from the Bluefield Mountains, *Purdie;* from Venezuela, *Fendler*, n. 143; from Ocaña, N. Granada, *Schlim*, n. 397 and 600 (pinnæ more membranaceous, narrower and more acuminated, and subinciso-serrate); and from Tarapota, Eastern Peru, *Spruce*, with a sharp, erect auricle, n. 4085; this plant, however, is very doubtful. All these bear a considerable resemblance to *A. auriculatum*, Sw. (A. falx, *Desv.*), but they want the large, rounded, and, if I may so say, crested auricle of that species, when an auricle is at all present. On the other hand, it bears little or no resemblance to the large-fronded, creeping-rooted plant of Plumier, with pinnæ 6 inches long and 1¼ inch broad, the four lower pinnæ having acute auricles nearly ¼ of an inch long. Mettenius refers the *A. salicifolium* of Sieb. Fl. Martin, n. 34 *b* (346?), to his *A. falx*, Desv. My specimens are scarcely at all diplazioid.

62. A. (Euasplenium) *anisophyllum*, Kze.; "fronds linear-lanceolate" (in our specimens often ovato-lanceolate) "membranaceous pinnated, pinnæ numerous approximated subopposite smaller at each extremity patently divergent ovato-lanceolate (often oblong-lanceolate as in Mettenius's figure) long-acuminate obtusely serrated or incised, the base unequal the superior base truncated the inferior exciso-cuneate tapering into a short petiole, sori sparse elliptical, stipes and rachis winged above partially paleaceous." *Kze. in Linnæa*, x. *p.* 511.—*Pappe and Raws. Syn. Fil. Afr. Austr. p.* 18. *Metten. Asplen. p.* 99. *t.* 4. *f.* 12. *Moore, Ind. Fil. p.* 112. A. nigrescens, *Hook. fil. Pl. of Galapagos, in Linn. Soc. Trans.* xx. *p.* 170. *Metten. Asplen. p.* 101.—Var. *inciso-subpinnatifidum;* pinnæ lanceolate pinnatifido-serrate, segments in the lower half bifid. Var. *latifolium;* fronds narrow elongated, pinnæ shorter from a broad base suddenly acuminated deeply inciso-serrated, lower serratures unequally bifid superior ones entire all obtuse, rachis proliferous at the apex. (Tab. CLXVI.)—A. anisophyllum, *β, Kze. in Linnæa*, x. *p.* 512. *Var.* elongatum, *Metten. Asplen. p.* 99.

Hab. Normal form, with the pinnæ generally lanceolate or oblong-lanceolate

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* *A.* (Euasplenium) *cultrifolium*, Roxb. (var. L.); "stipes smooth, grooved; fronds (2–4 feet high) subopppositely pinnate; leaflets lanceolato-falcate, taper-pointed, gash-serrate, firm, and smooth; fructifications in rather remote, longish, parallel lines; involucre separating inwards," *Roxb. Crypt. Pl. by Griff. p.* 498 (*vix L.*).

Hab. Amboyna, *Roxburgh.*

(as represented by Mettenius, *l. c.*); S. Africa, chiefly the eastern districts, at and towards Natal, *Drège*, *Gueinzius*, *Sanderson*, *Capt. Garden*.—Var. *lucido-pinnatifidum*. Graham's Town, *Col. Bolton*. Natal, *J. L.*] *Meade*.—Var. *latifolium*. Natal, *Sanderson*. Kat River, *Ecklon*. Bourbon, *Boivin* (fide *Metten.*). Tropical S. America, Brazil, *Gardner*, n. 5942, 5964. Cuba, *Linden*, n. 1007; *Wright*, n. 845. Galapagos, *Darwin*, *Capt. Wood* (stipes and rachis almost black, with quite the habit and pinnæ of *A. Prionitis*, but the serraturæ less acute).—I prefer giving the specific character of the author of the species to any framed by myself. Kunze observes: "Differt a præcedentibus" (*A. pruniferum* and *A. Prionitis*) "fronde lineari-lanceolata, pinnis numerosioribus (ad 32), patenti-divergentibus approximatis suboppositis" (by no means constant), "basi valde inæqualibus, soris abbreviatis costæque vicinis. Forma β illi a cl. de Schlechtendal, cum suo *A. lucido* descriptæ alinque *A. protensi*, Schrad., omnino analoga." The main distinguishing character, I fear, must be looked for in the very short and very tumid sori; the involucre also is subfornicate, as in *Athyrium*. This species has generally been considered peculiar to S. Africa. Mettenius refers to it a specimen from Bourbon, Moore from Ceylon and Central America, and in my herbarium the latter author has noted specimens from widely-separated localities in the New World and Galapagos as the same. The S. American state, however, has less serrated margins to the pinnæ, and I must confess, ready as I am to agree to this opinion, it thus becomes difficult to discriminate between it and *A. oligophyllum*, Kaulfs., also S. American, and even *A. persicifolium*, J. Sm., from the Philippines, etc. In short, it is no easy task to know when to separate and when to combine. It will be seen by the figure I have given of one of the varieties at our Tab. CLXVI., how unlike it is to the normal form represented by Mettenius, yet I am satisfied they belong to one and the same species.

63. A. (Euasplenium) *salicifolium*, L.; caudex short thick somewhat woody enveloped in a dense mass of ferruginous woolly fibres and generally bearing the split wiry bases some inches long of the former year's stipites, stipites cæspitose a span to a foot high, fronds 1 to 1½ foot long broad-ovate acuminate pale opaque dull-green subcoriaceo-membranaceous impari-pinnate, pinnæ remote especially the lower ones spreading 4–6 inches long from a broad obliquely cuneate base (tapering into rather a long petiole) broad-lanceolate subfalcate much acuminated obscurely and remotely serrated or quite entire, superior base slightly produced and rounded scarcely at all auricled, the inferior more oblique, veins erecto-patent rather close twice or thrice forked terminating within the margin (and there occasionally anastomosing), sori linear elongate intermediate between the costa and the margin and not extending to either distant but very regular, involucre membranous.—*Linn. Sp. Pl. p.* 1538. *Sw. Syn. Fil. p.* 77. *Willd. Sp. Pl.* v. *p.* 313. *Kze. in Linnæa*, ix. *p.* 64. *Metten. Asplen. p.* 100. *t.* 4. *f.* 14. Lonchitis glabra major, *Plum. Fil. t.* 60. A. integerrimum, *Spr. Nov. Act. N. C.* 1821, *p.* 231 (*not Wall.*). *Presl, Tent. Pterid. p.* 107. *Moore, Ind. Fil. p.* 138. A. salicifolium, *var.* integerrimum, *Metten.*

Asplen. p. 101. A. Neogranatense, *Fée, 7me Mém. Foug. p.* 47. *t.* 14. *f.* 1 (*pinnæ few, much elongated sometimes nearly a foot long*). A. Kepplerianum, *Kze. in Linnæa*, xxi. *p.* 216. A. salicifolium, *var.* Kepplerianum, *Metten. Asplen. p.* 101.

Hab. Tropical America, Martinique, *Plumier*. West Indies, probably general: but I have only received it from Cuba, *Linden*, *n.* 1891; *C. Wright*, *n.* 841. New Granada, *Schlim*, *n.* 603 *and* 492 (A. Neogranatense, *Fée*). Venezuela, *Funck*, *n.* 684. Surinam, *Hostmann*, *n.* 879, *Keppler*. Panama, *Seemann*, *n.* 361. Pará, *Spruce*, *n.* 37. Rio, *Lady Calcott* (with one or more lobes at the base of the lower pinnæ). Peru, *Pœppig*.—Few species of *Asplenium* are less understood than the present. In books the name has been given to four or five different Ferns, and in herbaria to many more. Linnæus and Swartz and Willdenow have done little more than refer to Plumier's figure as the authority for the Linnæan species; and that figure represents the pinnæ too strongly serrated, and the superior base too much auricled for any species known to us; hence the larger states of *Aspl. auriculatum*, Sw. (A. falx, *Desv.*), have been very generally taken for it. Kunze observes in Linnæa (vol. ix. p. 64), "Lætamur veram plantam Plumerianam, ut videtur rarissimam et paucis notam, restituere posse," and by his brief but accurate description, he has, we think, led to a more correct knowledge of it. The caudex is remarkable for the dense rusty downy covering, and for the persistent remains of the old stipites, from which the outer coat has broken away, while the wiry bundles of vessels (*fasciculi vasorum*) remain like coarse horsehair, springing from the caudex. I have seen no distinct auricle on any of my numerous specimens, and so nearly entire are the margins, that the *Aspl. integerrimum* cannot stand even as a var. of *salicifolium*; to be entire in the most common state of the pinnæ. I have never seen specimens from Jamaica, though Swartz and Willdenow quote that locality; nor from Bourbon, perhaps erroneously so given by Swartz. The much more unequally sided pinnæ of *A. auriculatum*, and the strong serratures and large auricles of a semicordate form, produced towards the rachis and often overlapping it (crested, as it were), readily distinguish that species from *A. salicifolium*.

64. A. (Euasplenium) *Wrightii*, Eat.; stipes a foot and more long stout paleaceous below with thin membranaceous subulate scales, fronds 2½ feet long ovato-lanceolate subcoriaceo-membranaceous dark-green paler beneath multipinnate, pinnæ spreading 4–6 inches long lower ones remote upper ones gradually diminishing in size lanceolate more or less falcate much and gradually acuminate the base obliquely cuneate and suddenly attenuated into a short winged petiole superior (rarely the inferior one) with a deep broad obovate lobe, the rest of the margin pinnatifid cut into shallower obtuse lobes gradually terminating in a deeply inciso-serrated acumen, all the lobes strongly and sharply serrated at their obtuse apices, ultimate pinnæ small obovate serrated confluent so as to form a winged rachis, veins distant, once or twice forked oblique the veinlets terminating within the margin and clavate, sori linear intermediate between the

costa and the margin, involucre black the margin pale. (Tab. CLXXXII.)—*Eaton, MS. in Herb. Nostr.*

Hab. Tukonoshima, Japan, *C. Wright, Herb. of the U.S. North Pacific Explor. Exped. under Commodores Ringgold and Rodgers*, 1853–1856.—This is a very fine species, and very distinct from any *Asplenium* known, but evidently belonging to the *Salicifolium*-group, and perhaps most nearly allied to the species *A. salicifolium* itself. It is extremely different from that, however, in the much-lobed margins of the pinnæ, in the large obovate auricle at the superior base, in the long, falcate, and very acuminated apex, where the lobes are reduced to large serratures. As it was sent to me by Dr. Asa Gray (among many other rare Japanese plants) without any name, I had proposed to dedicate it to D. C. Eaton, Esq., of Newhaven, Connecticut, the very able American Pteridologist, who is preparing a notice of all the Ferns of this scientific Exploring Expedition; but that gentleman considers that its discoverer has a stronger claim to the compliment.

65. A. (Euasplenium) *zamioides*, Hook.; stipes and rachis deciduously scaly compressed and sulcated, frond a foot and more long oblong-acuminate firm coriaceo-membranaceous opaque (probably very succulent when fresh) impari-pinnate, pinnæ 14–16 or 17 horizontally patent dimidiato-ovate sometimes subfalcate obtuse or obtusely acuminate 2½ to 3 inches long quite entire the base obliquely cuneate and tapering into a very short petiole superior extended sometimes forming an obtuse angle or imperfect auricle, terminal pinna the largest elliptical-ovate with a more or less distinct lobe on one side, veins sunk subflabellate especially near the base erecto-patent twice or more forked distant, costa indistinct, sori elongated almost parallel with the obscure costa often interrupted sometimes an inch long and extending to the margin, costa stout compressed. (Tab. CLXX.)

Hab. Isle of Penang, *Dr. Hance*.—No Fern that I am acquainted with merits a name implying a resemblance to the leaves of a *Zamia* more than the present. I believe the *A. zamiæfolium* of Willdenow is merged into *A. dimidiatum*, Sw., and that of Presl he has himself changed to *Taraxhia Hookeræ*. In case others should think differently of these changes, I trust the name *A. zamioides* will not be deemed objectionable. It is a very distinct species, and not liable to be confounded with any other, but has some characters in common with the *Falcatum*-group, having affinity with *Aspl. macrophyllum*: but here the pinnæ are quite entire, and the venation is very different.

66. A. (Euasplenium) *sanguinolentum*, Kze.; "petiole 6 inches long livid-brown, frond subcoriaceous opaque-green eventually glabrous 7 inches to a foot long oblong a little attenuated at the base acuminated impari-pinnate, pinnæ 6–12 pairs obliquely patent petiolate 2½–3½ inches long, from an inferior cuneate base superior broader obliquely or exciso-truncate auriculate or subauriculate ovato-lanceolate

acuminated obtusely duplicato-serrate, lowest pinnæ somewhat diminished in size, auricles duplicato-serrate sterile veins immersed distant 1–2 lines apart at an angle of 20–35° (the lowest excepted) forked from the base, sori on each side 10–16 two lines long oblong impressed prominent not exceeding half the width of the pinnæ between the rachis and margin, involucre membranaceous rather broad fornicate manifestly passing (*productum*) into the parenchyma." *Metten. Asplen. p.* 98. *t.* 4. *f.* 10.

Hab. Brazil (*Beyrick*). Venezuela, "*Funck and Schlim. n.* 606."—Apparently only known to Kunze and Mettenius. The latter has furnished us with a character, but it is to be regretted no remarks are made on its affinities. Mettenius places it between *A. Zenkerianum* (our *A. persicifolium*) and *A. anisophyllum*: but, judging from the size of the pinnæ figured, it is a much smaller plant than either.

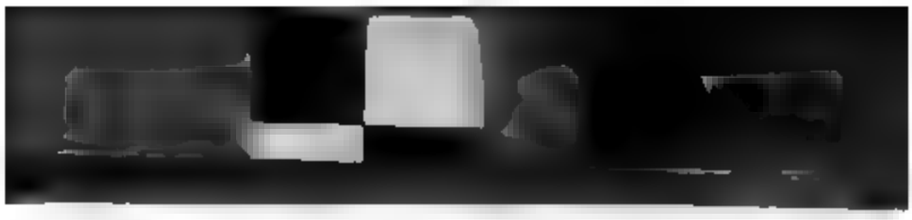
67. A. (Euasplenium) *chlænopteron*, Fée; "fronds pinnate lanceolate, rachis compressed, petiole sulcate and depressed, pinnæ ovato-lanceolate acuminate glabrous shortly stipitate oblique at the base emarginate below gibbous above the margin crenate, crenatures unequal, veins disappearing within the margin, sori short adult ones thick and connivent, involucre very broad, sporangia ovate large, annulus 22–24 articulated, spores subreniform." *Fée, Gen. Fil. p.* 194, *and 7me Mém. Foug. p.* 47. *t.* 16. *f.* 1.—*Metten. Asplen. p.* 98.

Hab. Bourbon (*Olivier*).—The whole plant seems scarcely more than a span or a foot high.

68. A. (Euasplenium) *Feei*, Kze.; "fronds pinnate squamulose lanceolate radicant, rachis violet-purplish at the base, pinnæ 15–18 pairs lanceolate cuneate at the base margined below extended at the apex which is caudiform serrated and sterile the margin bidentate(?), teeth unequal subincised, veins remote thickish, costa slender, flexuose, pale, sori very thick turgid ovate brown, involucre large white, capsules reddish, pedicel very long, annulus 24–26 articulated, spores ovate." *Kze. in Litt.—Fée, Gen. Fil. p.* 194. *7me Mém. p.* 49. *t.* 15. *f.* 2. *Metten. Asplen. p.* 98. *Moore, Ind. Fil. p.* 129.

Hab. Mexico, *Galeotti*.—A species quite unknown to me, probably nearly allied to *A. hastatum*, Kze. in Linnæa, xxiii. p. 305, from Venezuela, etc.—It is a native of Mexico; and, judging from the figure and description, scarcely differs from *A. hastatum*, except in the larger terminal lobe, more uniformly serrated pinnæ, and the more oblique and shorter sori. Mettenius and Moore, however, both uphold it as a species.

69. A. (Euasplenium) *angustifolium*, Mich.; fronds gla-



brous 1–3 feet long membranaceous pellucid flaccid of two kinds (both on glossy stout stipites a foot or more long) oblong-lanceolate erect pinnated, pinnæ numerous horizontally-patent subsessile, sterile ones from a broad truncated base acuminate quite entire or toothed 3–4 inches long, veins simple or forked, fertile pinnæ narrow-lanceolate acuminate smaller than the fertile, sori horizontally-patent copious approximate slightly recurvo-falcate extending from the costa to near the margin, involucre of the same form slightly fornicate very prominent firm-membranaceous.—*Mich. Fl. Bor. Am.* ii. *p.* 265. *Sw. Syn. Fil. p.* 76. *Willd. Sp. Pl.* v. *p.* 313. *Schk. Fil. p.* 63. *t.* 67 *and* 69. *Gray, Man. of Bot. Illustr. p.* 594.

Hab. United States, *Michaux*; rich woods W. New England to Michigan; Kentucky, along the mountains, *Asa Gray*. Canada, *Cleyhorn*.—A species very easily recognized by its dimorphous fronds (the fertile pinnæ smaller than the sterile ones), the copious and regularly placed sori, and the tumid involucres, quite ethyrioid, of a firm texture.

70. A. (Euasplenium) *hastatum*, Kl.; caudex short densely rooting with ferruginous woolly fibres paleaceous above, stipites cæspitose a span long, fronds subcoriaceo-carnose oblong-ovate pinnated the apex caudate and pinnatifid, pinnæ 20–24 petiolate 2½–3 inches long from a broad abruptly and unequally cuneate base lanceolate gradually and finely acuminated scarcely falcate coarsely sinuato-serrate the apex entire superior base subtruncate but scarcely auricled, veins immersed forked distant erecto-patent, sori prominent linear almost parallel with the costa not reaching to the margin, involucres firm dark-coloured, rachis compressed scarcely winged. (Tab. CLXXII.)—*Klotzsch. Kze. in Linnæa*, xxiii. *p.* 305. *Metten. Fil. Hort. Lips. p.* 73. *Metten. Asplen. p.* 102.—Var. *pterocaulon*; smaller, pinnæ shorter more entire, rachis winged. A. fragrans, *Hook. Ic. Plant. t.* 88. A. odoratum, *Moore, Ind. Fil. p.* 151.

Hab. Venezuela, *Karsten*. Tovar, *Moritz*, *n.* 243. Caracas, *Linden*, *n.* 169. —Var. *pterocaulon*. Woods of Guachapala, and Andes of Quito, elev. 6000 feet, *Jameson n.* 50 *and* 216. Tovar, Venezuela, *Fendler*, *n.* 331 *β, and n.* 144. —Our figure and character are taken from fine specimens gathered by Moritz, and are the same as Mettenius's plant, l. c. I have already alluded to its close affinity with the *A. Feei*. Kunze speaks of its proximity to *A falx*, Desv. and *A. auriculatum*, Sw., which are here united under the latter name. Moore refers it to *A. falx*, and I must confess that my specimens from Linden seem to form a connecting link: nevertheless, the absence of the peculiar auricle may justify its being kept distinct. The distinguishing marks are given in our two figures, Tab. CLXXI. and CLXXII.—I think Mettenius has done right in uniting my *A. fragrans* (so called, because Dr.

Jameson assures me the fresh-dried specimens have the fragrance of new-made hay), of which it may be considered an alpine variety. The name of *fragrans*, however, though older than *hastatum*, cannot be retained, not being the *fragrans* of Swartz. Moore, considering it distinct, has in his Index Fil. changed the name to *A. odoratum*. Besides being much smaller than the true *hastatum*, the pinnæ are much shorter and less acuminated, 1–2 inches long, and the rachis is strongly winged. One can have paid but little attention to the species of *Asplenium*, who has not satisfied himself that these are variable characters; indeed, the wing is almost obsolete in some of our specimens of this variety. The Andine specimens of Dr. Jameson, marked n. 50, have the pinnæ deeply cut and lobed, and in one instance bipartite.

71. A. (Euasplenium) *elongatum*, Sw.; caudex a small thick rhizome sparsely scaly, stipites 6–8 inches long cæspitose and as well as the compressed rachis pale-brownish-green and subfurfuraceous with small lacerated deciduous scales, fronds pale-green 8 to 12 inches long oblong suddenly acuminate coriaceo-membranaceous opaque pinnate, pinnæ 1–2 inches long petioled horizontally-patent gradually smaller upwards approximate (in general) oblong quite straight or subfalcate very obtuse strongly serrated the base truncato-cuneate oblique, superior base distinctly auricled inferior sub-excised, terminal pinna narrow elongated acuminate pinnatifido-serrate sometimes twice or thrice as long as the rest, veins simple oblique, sori copious on almost every vein short-linear intermediate between the margin and the costa, involucres narrow-linear very firm.—*Sw. Syn. Fil. p.* 79. *Kze. Bot. Zeit.* vi. *p.* 174. *Metten. Asplen. p.* 112. A. caudatum, *Cav. Demonstr. p.* 265. *n.* 632. A. productum, *Pr. Reliq. Hænk.* i. *p.* 42. *t.* 8 *f.* 1 (*excellent*).—Var. *acuminatum*; segments acuminate. A. Doreyi, *Kze. Annal. Pterid. p.* 23. *Moore, Ind. Fil. p.* 126.

Hab. Marianne Islands (*Sw.*). Luzon, *Cuming*, *n.* 163. Java, *Blume*, *Zollinger*, *n.* 2220. Sincapore, *Sir W. Norris*. Penang, *Lady Dalhousie*, *Hance*. Borneo, *Wallace*. Taheiti, *Barclay*. Ceylon, *Mrs. General Walker*, *Gardner*, *n.* 1078.—Var. *acuminatum*, "New Guinea, *Dorey*, and Java, *Zollinger*, *n.* 2935."—A well-marked species, very regular, and rather stiff and formal in the arrangement of the pinnæ, and of the sori upon the pinnæ. Presl's figure above quoted is a peculiarly happy one.

72. A. (Euasplenium) *tenerum*, Forst.; "fronds pinnate, pinnæ oblong obtuse obtusely dentate, the superior base truncato-subauriculate, inferior cuneato-abbreviate." *Willd.*—*Forst. Prodr. p.* 80. *Sw. Syn. Fil. p.* 78 *and* 266. *Schk. Fil. p.* 65. *t.* 69. *Metten. Asplen. p.* 113.—"Var. leaves coriaceous pale beneath, segments 1½ inch long." *Metten. l. c.*

Hab. Pacific Islands, *Forster*.—Var.: Ceylon, *Gardner*, *n.* 26 (*Mettenius*).—I

have seen no authentic specimen of this, but I have slightly abnormal forms of *A. elongatum*, which very much resemble the figure of Schkuhr, and agree sufficiently well with the description. The only two localities given for *A. tenerum* are the Pacific Islands and Ceylon. *A. elongatum* is found in the same islands. Mettenius, also, who seems acquainted with the present species, places it next to *A. elongatum*.

73. A. (Euasplenium) *auriculatum*, Sw.; caudex short erect clothed with woolly ferruginous fibres bearing imbricated lanceolate scales at the summit, stipites 4 inches to a span and more long stramineous 1–1½ foot long subcoriaceo-membranaceous ovato-lanceolate yellow-green impari-pinnate, pinnæ 16–20 horizontally patent petiolate 2–3 inches long from a broad unequally cuneate or semicordate base lanceolate acuminate subfalcate duplicato-serrate (no thickened margin), subsinuate at the apex, superior base extended towards the rachis into a large rounded lobe or crest-like auricle (often imbricating the rachis) with a deep sinus next the petiole, inferior base excised and forming an angle at some distance from the petiole, terminal pinna from a broad base acuminated the lower portion pinnatifid with rounded unequal lobes, veins forked distant oblique, sori distant linear neither reaching the rachis nor the margin and not extending to the auricles, rachis slender compressed (not winged. (Tab. CLXXI.)—*Sw. Vet. Acad. Handl. Stockh.* 1817, *p.* 68. *Kze. in Linnæa*, xxi. *p.* 217 (*obs.*). *Moore, Ind. Fil. p.* 114. A. falx, *Desv. Mém. Soc. Linn.* vi. *p.* 275. *Fée, Gen. Fil. p.* 191. *t.* 17 *C. f.* 2 (*portion of a pinna only*). *Moore, Ind. Fil. p.* 129. A. semicordatum, *Raddi, Fil. Bras. p.* 36. *t.* 52. *f.* 1. *Metten. Asplen. p.* 102. *Mart. et Gal. Fil. Mex. p.* 39.* A. abscissum, *Raddi, Syn. Fil. p.* 94 (*non Willd.*). A. cultrifolium, *Sieb. Syn. Fil. n.* 179. A. discolor, *Kze. in Linnæa*, ix. *p.* 65. A. pimpinellifolium, *Fée, 7me Mém. p.* 52. *t.* 25. *f.* 5 (*small, pinnæ shorter, less auricled*).

Hab. Tropical America; in the West Indies, and on the continent of South America. Peru, *Pœppig, Mathews.* Tarapota, *Spruce, n.* 4676. Brazil, frequent. Pará, *Spruce, n.* 38 *B.* Guiana, *Schomburgk, n.* 451, *C. S. Parker.* Cayenne, *Le Prieur.* Archedona, Quito, *Jameson* (same as *A. pimpinellifolia*, Fée, which is also found in Mexico), *Schaffner.* Guadeloupe, *L'Herminier.* Dominica, *Dr. Imray.* Cuba, *Wright, n.* 848. St. Vincent, *L. Guilding.*—The above localities are almost entirely from specimens in my own herbarium, and I might have added many more from the same source, as well as from Moore's useful 'Index Filicum.' The species is very common, but has been greatly misunderstood, and

* Fée, Gen. Fil., refers to Galeotti's plant, n. 6340, as a new species, *A. lamprocaulon*.

I think there can be no question of the correctness of the synonyms above adduced, and of the propriety of restoring the oldest name, *auriculatum*, given no doubt on account of the large rounded auricle, which has a peculiar curvature (cristate) towards the rachis, and overlapping it: and which is more or less present in all my specimens: in one, some of these auricles are separated from the main pinna, and form a distinct flabelliform pinnule. Our present figure will, we trust, help to clear up the difficulties that have attended the determination of this species.

74. A. (Euasplenium) *riparium*, Liebm.; caudex short thick subrepent, stipites 6–8 inches long semiterete channelled in front, frond 1–2 feet long oblongo-ovate or ovate acuminate dark-green blackish when dry (apparently subcarnose when recent) pinnated, pinnæ 15–20 petiolate patent 3–4 inches long from an obliquely cuneated base lanceolate acuminate subfalcate, superior base truncated dilated and forming a more or less distinct angle or auricle sometimes slightly sinuato-lobate and rather finely and unequally serrated, inferior base more or less excised, terminal one generally broader than the rest more finely acuminated the lower half pinnatifido-lobate, the base equally cuneate and rather long-petioled, veins rather distant once or twice forked extending to the slightly thickened margin not clubbed at the apex always terminating in a tooth, sori linear oblique extending from near the slender vein-like costa almost to the margin, rachis compressed often flexuose. (TAB. CLXIX.) —*Liebm. Fil. Mex. p.* 92. A. salicifolium, *Spr. Anl.* iii. *t.* 3. *f.* 28 (*not Linn.?*). *Raddi, Fil. Bras. p.* 35. *f.* 50.—Var. *obtusifolium*; pinnæ fewer shorter very obtuse variously lobed and laciniated. (TAB. CLXIX. *f.* 4.) A. obtusifolium, *Linn. Sp. Pl. p.* 1538. *Sw. Syn. Fil. p.* 76. *Hook. and Grev. Ic. Fil. t.* 239. *Metten. Asplen. p.* 100. A. repandulum, *Kze. in Linnæa*, ix. *p.* 65. *Metten. in Fil. Hort. Lips. p.* 73. A. lætum, *Sieb. Syn. Fil. n.* 199. A. coriaceum, *Desv. Mém. Soc. Linn.* vi. *p.* 70. A. aquaticum, *Kl. et Karsten, in Linnæa*, xx. *p.* 354.—Lonchitis aquatica, membrana tenui contexta, *Plum. Fil. p.* 51. *t.* 67.

Hab. S. America, Martinique, *Plumier*, by streamlets in moist woods. Brazil, in wet places by rocks and waterfalls, *Raddi*. Organ Mountains, *Gardner, J. D. Hooker*. Mexico, *Liebmann, Galeotti* (damp rocks and waterfalls), *n.* 6274, *Linden, n.* 68. Xalappa, *Harris*. Tarapota, Eastern Peru, *Spruce, n.* 4676.—Var. *obtusifolium*. Moist places, and even in water. Martinique, *Plumier, Sieber*. Guadeloupe, *L'Herminier*. Dominica, *Dr. Imray, n.* 13. N. Granada, *Karsten, Schlim, n.* 653 (on moist stones). Venezuela, *Fendler*. Western declivity of Pichincha, *Hartweg*.—Under the name of *A. obtusifolium*, a peculiar variety of this species has been long known to us, and it is not ill represented in Plum. Fil. above quoted, but much better in the 'Icones Filicum,' from the accurate pencil

of Dr. Greville. At a much later period the normal state of this plant, as I consider it to be, was detected and confounded, by Sprengel first and afterwards by Raddi, with the *A. salicifolium* of Linnæus, from which it differs in several respects. Among its many peculiarities are the strong creeping succulent root, the dark-green and subcarnose, subpellucid fronds, the thickened margin to the pinnæ, and the veins almost extending to the thickened edge. It is generally noted to inhabit wet places in the vicinity of waterfalls, and the var. *obtusifolium* looks, by its smaller size and jagged and variously cut margins to the pinnæ, as if it might have suffered from too much water or from the falling force of that element. Plumier, indeed, calls it "*Lonchitis aquatica*." It is the more perfect forms of this species which Mr. Moore has marked in my herbarium as *Aspl. salicifolium*, and it may possibly be an aquatic form of it. If I am correct in considering *A. riparium* the more perfect state of *A. obtusifolium*, the latter appellation is very inapplicable to it.

75. A. (Euasplenium) *fuliginosum*, Hook.; stipes short erect or declined rather thick, stipites tufted very short 1–1½ inch long and as well as the rachis clothed with spreading subulate very black crinite scales, fronds a span to a foot long broad-lanceolate rather rigid-membranaceous opaque dark blackish-green when dry pinnated, the apex is pinnatifid, pinnæ numerous approximate lanceolate subfalcate acute rather than acuminate quite sessile and rather broad at the base the margin crenulato-serrate, veins simple or once or twice forked oblique, sori linear small occupying the apex of the pinnæ, involucres black, costa partially setoso-paleaceous at the back.—*Hook. 2nd Cent. of Ferns, t.* 3, *ined.*

Hab. Kina Balu, Borneo, *Hugh Low, Jun.*—A very peculiar-looking species, of a singularly gloomy black colour when dry, crinite, with black, rather rigid, spreading scales. It may rank near to *A. riparium*, but rather from colour than general form: its exact affinities are rather doubtful.

76. A. (Euasplenium) *bicrenatum*, Liebm.; "frond subcoriaceous glabrous glaucous-green paler beneath 15 inches long 6 inches wide (with the stipes 4–5 inches) lanceolate pinnate, pinnæ twelve to fifteen on each side gradually smaller upwards alternate horizontal petiolate (petioles 2 lines long compressed) 3 inches long 6–8 lines wide obliquely lanceolate long-acuminate acute superior base cordato-auriculate, auricle rounded or angulato-rotundato-crenate, inferior base truncated entire, the margin on both sides inciso-bi- rarius tricrenate with the crenatures obtuse, costa slightly prominent in front sunk beneath, veins on both sides immersed running out at an acute angle and bifurcate, sori near the costa 3 lines long, stipes and rachis glabrous brown channelled in front acutangled at the back." *Liebm. Fil. Mex. p.* 93.—*Metten. Asplen. p.* 101. *Moore, Ind. Fil. p.* 116.

Hab. Oaxaca, Mexico; elev. 2–3000 feet of the Cordilleras, *Liebmann*.—This, if I understand rightly from the remarks in the Danish language, and as may be inferred from the specific character, is allied to *A. auriculatum* of Swartz and this work (*A. falx*, of other authors).

77. A. (Euasplenium) *gibbosum*, Fée; "fronds pinnate lanceolate entirely glabrous, pinnæ 17–19 pairs petiolate lanceolate horizontal or a little deflexed acuminate crenulate inferior base cuneate semicordate auricled above cristato-gibbose, the margins crenate, crenatures unequal, nervelets remote not extending to the margin, sori distant narrow inverse at the auricle, sporangia ovate shortly pedicellate, annulus 18–20-articulate, spores episporiate fimbriate in the circumference naked and subreniform." *Fée, Gen. Fil. p.* 195.—*Metten. Asplen. p.* 101. A. salicifolium, *β*, *Griseb. Pl. Carib. p.* 134 (*fide Mett.*).

Hab. Guadeloupe, *Perottet, Duchassaing*.—"Folia (pinnæ) valida, lobo cristato magno superiore insigne."—As the author observes, "Cette fougère doit prendre place à côté de l'*A. falx*," it may probably be safely referred to that species (*A. auriculatum*, Sw.).

78. A. (Euasplenium) *compressum*, Sw.; glabrous, caudex erect short or scarcely any, stipites tufted stout semiterete paleaceous a span long, fronds including the stipes 2 feet and more high cæspitose ovato-lanceolate acuminate carnoso-coriaceous pale-green pinnated, pinnæ patent oblong-ensiform gradually acuminated obscurely sinuato-serrate, the broad truncated superior base parallel with the rachis, inferior base excised and alato-decurrent on the rachis, costa strong proliferous from gemmæ, veins forked, sori large oblong nearly transverse, involucre firm pale, rachis compressed stout winged.—*Sw. Syn. Fil. p.* 79 *et p.* 270. *Willd. Sp. Pl.* v. *p.* 320. *Hook. Fil. Exot. t.* 76. *Metten. Asplen. p.* 100. A. fœcundum, *Kze. in Linnæa*, xx. *p.* 234 *et p.* 305. *Metten. Fil. Hort. Lips. p.* 73. Darea fœcunda, *Fée*.

Hab. St. Helena, *Masson, Fraser, J. D. Hooker, Lady Dalhousie, Cuming*, n. 430.—Exclusively, we believe, a native of St. Helena, and very distinct in its characters.

79. A. (Euasplenium) *alatum*, H.B.K.; caudex indistinct almost none, stipites cæspitose 4 inches to a span high winged as is the whole rachis between the pinnæ with generally a broad green margin, fronds herbaceous membranaceous broad-lanceolate acuminate often proliferous at the apex pinnated 1–1½ foot long, pinnæ rather numerous distant horizontal 1–2 inches long nearly sessile from an

unequally and shortly cuneated base oblong obtuse duplicato-serrated superior base auriculate, veins once or twice forked, sori linear oblique nearer the costa than the margin, involucre narrow-linear membranaceous.—*H.B.K. Nov. Gen. Am.* i. *p.* 14. *Willd. Sp. Pl.* v. *p.* 319. *Hook. et Grev. Ic. Fil. t.* 137. *Metten. Fil. Hort. Lips. p.* 72. A. pterophorum, *Pr. Tent. Pterid. p.* 107.

Hab. Tropical America, N. Granada, *H.B.K.*, *Moritz*, n. 175. Venezuela, *Fendler*, n. 145. Peru, *Poeppig*. Forest of Archidona, Ecuador, *Jameson*. Brazil, Organ Mountain, *Gardner*, n. 670, and n. 5940. Tarapota, Eastern Peru, *Spruce*, n. 4154, and n. 4675. St. Vincent, *C. S. Parker*. Jamaica, *Dr. Bancroft*, *Purdie*, *M'Fadyen*. Sugar-loaf Mountain, Sierra Leone, *Barter*.—A very peculiar species, having in general singularly broad, herbaceous wings on each side the stipes and between the pinnæ on the rachis, with a break or notch where the pinna is attached. These wings are, however, variable in breadth, often obsolete in the stipes, and occasionally nearly so on the rachis. The apex is so frequently proliferous that it is rare to find perfect terminal pinnæ, generally a prolonged rachis broken off at the apex. Our Sierra Leone plant is unquestionably the true *A. alatum*, but almost passing into our *A. erectum*, var. *prolyferum*, of the *Resectum* group.

80. A. (Euasplenium) *pteropus*, Klfs.; caudex small stout declined squamose, stipites 3–4 or 6 inches long tufted greenish-brown winged above, as is the entire rachis, fronds 1–1½ foot high elongato-lanceolate caudato-acuminate tapering at the base pinnated membranaceous, pinnæ numerous approximate horizontal short-petioled (uppermost ones minute and confluent) 1–1½ inch long from a broad unequally cuneate base lanceolate shortly acuminate coarsely and unequally serrated, superior base truncate auricled, inferior base excised, lowest pinnæ abbreviated, veins very distant simple (except at the superior base) terminating within the margin, sori oblong-linear, involucre very pale nearer the costa than the margin oblique (Tab. CLXXVII.)—*Kaulfs. En. Fil. p.* 170. *Metten. Asplen. p.* 119.

Hab. S. America. Brazil, *Kaulfuss*. Portorico, *Schwanecke*. Guadeloupe, *L'Herminier*. St. Vincent, *L. Guilding*.—This will rank next to *A. alatum*, chiefly differing in the narrower wings to the stipes and rachis, and in the closer placed pinnæ, which have more acuminated apices, and its place may be between that and our *A. erectum* as an intermediate species, if really deserving to constitute a *bonâ fide* species in a group so sportive as are it and its allies. Indeed, the present, as well as the preceding and following, have nearly as strong a claim to be arranged in the *Resectum*-group as here.

81. A. (Euasplenium) *rhizophorum*, L.; (normal form) caudex suberect stout subterraneous imbricato-paleaceous at the summit, stipites cæspitose a span and more long casta-

neous, fronds 1–2 feet long dark-green paler beneath membranaceous lanceolate pinnate gradually elongated, tapering upwards and there terminating in a filiform naked prolongation of the rachis several inches in length radicant at the very apex, pinnæ numerous 1½–2 inches long horizontally patent rarely ovate generally lanceolate subfalcate acute or acuminate quite entire or more or less sharply and often duplicato-serrate obliquely cuneate at the base scarcely petiolate, superior base produced into an acute erect auricle, inferior base moderately excised, superior pinnules remote gradually smaller exauriculate nearly or quite entire ultimate ones not 2 lines long, veins remote mostly simple except in and near the auricle oblique, sori linear-oblong distant from the costa and the margin, involucre very narrow soon obsolete. (Tab. CLXXXVII. *A.*)—*Linn. Sp. Pl. p.* 1540, *n.* 17 (A. rhizophyllum; *by error of the press: excl. the syn. of Sloane*). *Sw. Obs. Bot. p.* 399. *Sw. Syn. Fil. p.* 81. *Willd. Sp. Pl.* v. *p.* 334. *Metten. Aspl. p.* 131.—Adiantum *s.* Filix trichomanoides jamaicensis radiculas ex nutante apice ad terram demittens.—*Pluk. Alm.* ix. *t.* 253. *f.* 4. A. cirrhatum, *Richard, in Willd. Sp. Pl. p.* 321. A. Karstenianum, *Kl. in Linnæa,* xx. *p.* 353. A. mastigophyllum, *Fée,* 8*me Mém. Foug. p.* 83.—Var. 1. *pinnato-pinnatifidum;* pinnæ in the lower half lobato-pinnatifid towards the base almost pinnate lobes rounded or obovate or sublanceolate. (Tab. CLXXXVII. *B.*) A. cyrtopteron, *Kze. in Linnæa,* xxiii. *p.* 303. *Metten. Fil. Hort. Lips. p.* 75. *t.* 10. *f.* 3, 4. A. flabellulatum, *Kze. in Linnæa,* ix. *p.* 71. *Kl. in Linnæa,* xx. *p.* 257. *Metten. Asplen. p.* 130.—Var. 2. *bipinnatum;* fronds bipinnate, pinnules cuneate or obovate often toothed bi-trifid or incised. (Tab. CLXXXVII. *C.*) A. rhizophorum, *Sw. Obs. Bot. p.* 399. A. flabellulatum, var. dentatum, *Kl. in Linnæa,* xx. *p.* 357, and var. partitum, *Kl. l. c.*—Var. 3. *tripinnatum;* pinnules minute membranaceous cuneate bi-trifid or laciniate generally dareoid. (Tab. CLXXXVII. *D.*)—A. rachirhizon, *Raddi, Fil. Bras. p.* 39. *t.* 56. A. uniseriale, *Raddi, Syn. Fil. Bras.* 100. A. amabile, *Liebm. Fil. Mex. p.* 99.

Hab. Tropical America.—Normal state, with pinnæ nearly entire, rarely here and there lobato-pinnatifid. West Indies, Jamaica, *Dr. Bancroft.* Guadeloupe, *L'Herminier* (pinnæ obtusely crenate, scarcely auricled). Govan, Peru, *Lechler, n.* 2295. Tarapota, Eastern Peru, and Maypures, River Orinoco, *Spruce* (without number). Portorico, *Schwanecke* (*A. comptum,* Kze. Herb.). Venezuela, Tovar, *Moritz, n.* 429 (pinnæ auricled, and slightly sinuate at the margin, otherwise

quite entire); same form and same locality, *Fendler*, n. 140, *Birschel* (ordinary form); and *Fendler*, n. 434 (pinnæ shorter, broad at the base, falcate, deeply cut at the margin into narrow segments); Galipan, *Moritz*, n. 386 β (A. Karstenianum, *Kl.*). Brazil, Rio, *Gardner*, n. 171, and Organ Mountains, n. 5941 (pinnæ entire at the margin).—Var. 1. *pinnato-pinnatifidum*. Jamaica, *M'Fadyen*; Caracas, *Jurgensen*, n. 657. Venezuela, *Fendler*, n. 126 β. British Guiana, *Schomburgk*, n. 1906 (from Klotzsch, as *A. alloscopteron*, Kze. MS.). Kunze gives Venezuela, *Karsten*, *Metteniu*; and Portorico, *Schwanecke*, but my specimen from that collector and that locality is the normal form of the species.—Var. 2. *bipinnatum*. In this var. the superior small pinnæ are unchanged, the intermediate, and especially the lowest pinnæ, quite pinnate. Jamaica, *Dr. Bancroft*, *Purdie*, *M'Fadyen* (one specimen with small distant narrow cuneate bi-trifid pinnules; another with large broadly obovate pinnules, petiolulate, nearly half an inch long, lobulato-serrate, quite resembling the pinnules of *Aspl. cuneatum*). Cuba, *C. Wright*, n. 850 (large pinnules), and 851 (small pinnules). Columbia, *Moritz*, n. 43 and 44; *Otto*, n. 651 (pinnæ rhomboid pinnatifid, A. flabellulatum, var. partitum, *Kze.*). Merida, *Moritz*, n. "44 ?" (A. flabellulatum, dentatum, *Kunze*; pinnæ large). Venezuela, *Fendler*, n. 127 (large pinnæ).—Var. 3. *tripinnatum* (pinnules and superior pinnæ all small, laciniated, and dareoid). Brazil, Rio, *Raddi*, *Gardner*, n. 42, and 176. Island of St. Sebastian, *Mr. Fox*; Gongoseco, *Gardner*, n. 5308. Caracas, *Linden*, n. 153, and 163. N. Granada, *Funck*, n. 655. Oaxaca, Mexico, *Liebmann* (A. amabile, *Liebm.*). S. Pacific, Solomon's Group!, *Milne*, 1850, *Voyage of H.M.S. Herald*: identical with the S. American form.

Perhaps no Fern, and certainly no *Asplenium*, not even the *Aspl. lineatum* (our n. 47), presents a more extraordinary variety and series of forms than the one now under consideration, from the simply pinnate, or what is here considered the normal state,—of which a very tolerable resemblance is given by old Plukenet* above quoted, t. 253. f. 4,—to bi- and tripinnate fronds, with pinnules quite laciniated and cut into narrow segments resembling the most dissected of the species of *Darea* or *Cœnopteris* of authors, together with all intermediate states. As these different varieties have induced botanists to consider and describe them as different species, it becomes difficult to assign the synonyms to the exact variety. The uniting feature of these various forms into one species is to be found in the prolongation of the rachis into a flagelliform extremity to the frond, destitute of pinnæ, and rooting (and probably proliferous, but that I have never seen,) at the very apex, and to this character the species owes its original appellation, *Aspl. rhizophoron*, by an unfortunate mistake in the edition of 'Linnæi Species Plantarum,' of the date 1764 (that generally quoted), printed "*rhizophyllum*:" one state has been called, with great propriety as to application of the term, *rackirhison* (Raddi). Another author (Lowe, Nat. Hist. of Ferns, vol. v. plate 12 *B*) has called it *Aspl. radicans* of Moore and Houlston, quoting *Diplazium radicans*, Presl; a circumstance that I should hardly have thought it worth while to notice (of a work, too, not distinguished by botanical research), but that the accurate Moore, in 'Index Filicum,' p. 131, refers to the *Aspl. flabellatum*, Kunze, and *A. flabellulatum*, Klotzsch, who adopts that name from Kunze, l. c. as the "*Asplenium radicans*."† I am probably justified in presuming that this refers to the *Asplenium radicans* of Sw. Syn. Fil. p. 84, and if Moore and Houlston are the authority for Lowe's plant being the *Diplazium radicans* of

* Plukenet, however, represents the elongated rachis as rooting by its side as well as the apex, a state I have never seen, and it was probably a fancy of the artist.

† At the time I am writing, nothing of the 'Index Filicum' beyond the initial as has been published; of the references and synonyms, therefore, of his *A. ra-*

Presl, I cannot only say that I have been under an impression that the plant of these authors was a truly diplazioid species. Presl himself refers to Swartz, *A. radicans* (the earliest authority for the species), and to the figure of Schkuhr, t. 76 (called *radicans*, Sw., in the text, but *A. rhizophorum* in the plate), and this I have long known as a common West Indian species with large compound fronds and broad pinnules quite like the larger kinds of *Diplazium*, and well represented by Schkuhr, l. c. Desvaux, not Presl, appears to be the first who called it *Diplazium radicans*. This species, however, will be treated of more fully in its proper place.

Swartz was the first to notice the bipinnate form of *Aspl. rhizophorum* in his 'Observationes Botanicæ,' where he says, though he attributes the change to age, p. 399, under this species, "Planta junior simpliciter pinnata, adultior bipinnata." Some of the bipinnate specimens, with the larger obovate pinnules, bear a very close resemblance to small states of *Aspl. cuneatum*, Lam., and could with difficulty be distinguished from it but from the presence of the flagelliform rachis.—It may be a matter of surprise to see this species with its very compound pinnæ placed in the *Salicifolium*-group, but the simply pinnated form has a better right to such an arrangement and where the undivided pinnæ are an inch and a half long. Their comparatively small size indicates a passage to the *Resectum*-group. In proportion as the pinnæ become more compound, the length and breadth increases to 3–4 inches.

(Resectum-*group*. *Type* Aspl. resectum, *Sm.*—*Pinnate. Pinnæ rarely exceeding an inch in length, herbaceous or membranaceous, or subcoriaceous, entire or subpinnatifid, with the inferior base or margin more or less excised,—cut off by a straight or curved line.*)

82. A. (Euasplenium) *camptorachis*, Kze.; "frond membranaceous glabrous flexuose lanceolate attenuated at the apex (often gemmiparous) pinnate, pinnæ approximate sessile divergent or patulous, from an oblique base truncated above broadly auricled, below much cuneato-excised decurrent entire ovato-oblong obtuse duplicato- and obtusely serrated, lowest or inferior ones abbreviated ovate auricled on each side superior ones minute flabellate, sori near the costa oblong, on the lower half of the pinnæ none in the auricle sometimes solitary, rachis slender, margined flexuose and as well as the short stipes marginato-angulate, near the base squamose with fusco-paleaceous livid opaque scales, rhizome short rosulate, nigro-paleaceous radiculose." *Kze. in Linnæa*, xxiv. *p.* 262. —*Metten. Asplen. p.* 120. *Moore, Ind. Fil. p.* 118.

Hab. Neilgherries, *Schmid*, n. 123.—"Allied to *A. marinum*, L., but in the membranaceous, flexuose frond, the slender, scarcely compressed rachis, inferior and superior pinnæ being different from the middle pinnæ, and the stipes at the base rigidly paleaceous (not atro-purpureous), it is abundantly distinct." Mette-

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dicans, I am ignorant.—Since the above was printed, I am favoured by the author with a succeeding sheet of the Index Filicum, and find the *A. radicans* above quoted of Moore, is of Schkuhr (not Swartz).

gion, who seems to be acquainted with the species, places it next to *A. pteropus*, but offers no remarks on its affinities. I place it doubtfully in this section.

88. A. (Euasplenium) *erectum*, Bory; "rhizome erect crowned with acuminate setose scales, fronds 1–1½ foot long rigidly membranaceous glabrous linear-lanceolate pinnated pinnatifid at the apex, stipes reddish-brown margined with green between the pinnæ, pinnæ numerous shortly petiolate 1 inch long 3–4 lines wide from an unequal entire base which below is excise-cuneate and above truncate and auriculate (rarely so below) trapezoid-lanceolate acuminate incise-serrate, serratures obtuse, auricles dentato-serrate, veins oblique forked above the middle basal ones pinnate, sori elongate on each side at the costa rarely on the auricles, involucre membranaceous thin at length reflexed." *Metten.* —Normal form. *Bory in Willd. Sp. Pl. p.* 510. *Schlecht. Adumbr. p.* 28. *t.* 15. *Pappe and Rawe. Syn. Fil. Afr. Austr. p.* 18. *Metten. Fil. Hort. Lips. p.* 73. *Asplen. p.* 122. *Moore, Ind. Fil. p.* 127. A. mutilatum, *Klfs. En. Fil. p.* 171. A. inæquilaterale, *Willd. Sp. Pl.* v. *p.* 322. A. falcatum, *Thunb. Prodr. p.* 172. *Fl. Cap.* 316 ?, *not Lam.* A. lunulatum, *Sw.? Syn. Fil. p.* 80. *Willd.? Sp. Pl.* v. *p.* 324. *Schlecht. Adumbr.? p.* 27. *Kze. in Linnæa*, x. *p.* 514. *Metten. Asplen. p.* 121. *Pappe and Rawe. Syn. Fil. Afr. Austral. p.* 10. A. Dolabella, *Kze. olim. Fée, Gen. p.* 191. A. sphenolobium, *Kze. in Linnæa*, xxiv. *p.* 64. A. insulare, *Carm. Fl. Trist. d'Acunha, in Linn. Soc. Trans.* xi. *p.* 512. A. dentex, *Lowe, Hist. of Ferns*, v. *t.* 43. *A.* (*Moore*). A. "marinum?" *Thouars, Fl. Trist. d'Acunha, p.* 84 (*not L.*). A. brachyotus, *Kze. in Linnæa*, x. *p.* 512; xxi. *p.* 217; *and* xxiv. *p.* 261. *Pappe and Rawe. Syn. Fil. Afr. Austr. p.* 18. *Metten. Asplen. p.* 74. *Moore, Ind. Fil. p.* 117. A. Zeyheri, *Pappe and Rawe. Syn. Fil. Afr. Austr. p.* 18. A. auriculariuum, *Desv. Mém. Soc. Linn.* vi. *p.* 273. A. consanguineum, *Gaud. in Freyc. p.* 315. A. Brasiliense, *Raddi, Fil. Bras. p.* 36. *t.* 51. *f.* 1. *Kze. in Linnæa*, xxiv. *p.* 263. *Moore, Ind. Fil. p.* 117. A. pulchrum, *Wall. Cat. n.* 2211. A. tenerum, *Raddi, Syn. Fil. p.* 93. A. regulare, *Sw. Vetensk. Acad. Handl.* 1847, *p.* 67. *Pr. Tent. Pterid. p.* 107. A. triste, *Kaulf. Enum. p.* 170. *Kze. Flor.* 1839. *Metten. Asplen. p.* 120.—Var. *proliferum*; fronds generally dark-green, copiously proliferous at the apex. *Hook. Fil. Exot. t.* 72. A. radicans, *Pritchard, Cat. Pl. St. Helena, p.* 6. A. pavonicum, *Brack. Fil. Un. Str. Expl. Exp. p.* 150. *t.* 20. *Metten. Asplen. p.* 136. A.

reclinatum, *Houlst. and Moore, Gard. Mag. of Bot.* ii. *p.* 260. *J. Sm. Cat. of Cult. Ferns, p.* 44. *Lowe, Hist. of Ferns,* v. *p.* 13 *b.* A. lunulatum, *var.* proliferum, *Metten. Asplen., and var.* stoloniferum, *p.* 121. "A. stoloniferum, *Bory, Voy.* i. *p.* 329. *Sw. Syn. Fil. p.* 81. *Willd. Sp. Pl.* v. *p.* 333;" *and* "A. alatum, *Rich. Sert. Astrolab.* ii. *p.* 52" (*fide Mettenius*). A. Fernandesianum, *Kze. Annal. Pterid. p.* 22. *Metten. Aspl. p.* 124. *Gay, Fl. Chil.* vi. *p.* 503. *Moore, Ind. Fil. p.* 130. "*Colla, Pl. Chil.* xli. *p.* 69."—Var. *harpeodes;* larger 12–14 inches long, pinnæ more falcate long and finely acuminated. (Tab. CLXXVIII.) *Metten. Asplen. p.* 1122. A. harpeodes, *Kze. in Linnæa,* xviii. p. 329. *Liebm. Fil. Mex. p.* 90. *Moore, Ind. Fil. p.* 135. *Fée, Gen. Fil. p.* 196 (*fide Metten.*). A. falcatum, *Mart. et Gal. Fil. Mex. p.* 58 (*not Lam.*).—Var. *subbipinnatum;* pinnæ deeply lobato-pinnatifid, or again pinnate. A. erectum, *var.* pinnatipartitum, *Metten. Asplen. p.* 122. A. pulchrum, *Thouars, ex Pr. Tent. Pterid. p.* 108. *Kze. Bot. Zeit.* vi. *p.* 165 (*according to Metten. Asplen. p.* 118. *t.* 10. *f.* 516). A. cuneatum, *Kze. in Linnæa,* x. *p.* 516. A. reclinatum, *var.* lobatum, *Moore, in Herb. Nostr. and Ind. Fil. ined.* A. lobatum *and* A. gracile, *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 22. *Moore, Ind. Fil. p.* 141, *and* A. Pappei?, *Moore, l. c. p.* 152.

Hab. Here, lest I should have erred in amalgamating so many species of other authors whose opinions are at least equally worthy of respect with my own, I intend mainly to confine myself to specimens in my own herbarium, and especially to such as have been more or less circulated among botanists, and bearing numbers. I shall take what I have noticed above as variations, in succession, and offer a few observations thereon.—Normal form. Bourbon, *Bory. Herb. Mus. Paris. in Herb. Nostr.* (in some specimens there is an auricle both above and below the base). Mauritius, *Sieber, n.* 137, *Bouton.* S. Africa, abundant, *Miller* (bordering on *A. protensum*), *Zeyher, n.* 4629, *and n.* 691; *Drége* (one specimen marked *A. brachyotus*, Ker), *Milne, M'Gillivray, Sanderson* (from Natal and Macalisberg), *Dr. Alex. Prior, Mundt, W. H. Harvey.* Grahamstown, *Atherstone, Col. Bolton* (pinnæ longer, subacuminated, some specimens copiously proliferous at the apex, and some passing into the var. *subbipinnatum*), *Carmichael.* Tristan d'Acunha, *Carmichael* (A. biseriatum, *Carm. MS.*). West Indies, Cuba, *C. Wright, n.* 849 (large), *Linden, n.* 1895. St. Vincent, *L. Guilding.* Peru, Andemarca, *Mathews, n.* 1099, *and* 1100. Tarapota, Eastern Peru, *Spruce, n.* 3966. Columbia, *Moritz, n.* 185 *and* 186. Venezuela, *Fendler, n.* 138. Ecuador, Andes, *Jameson, n.* 24. Brazil, *Raddi, J. D. Hooker, Sellow* ("A. Sellovianum," and "A. Auricularia," *Desv., Kl. in Herb. Nostr.*), *Milne and M'Gillivray, n.* 188, *Swainson, Gardner, n.* 44, 163, *and* 166, *Martius* ("A. regulare," *Sw.*), *Raddi* ("A. tenerum"). East Indies, Peninsula, *Wallich, Wight, n.* 93. Neilgherries, *Thomson, M'Ivor, n.* 19 *and* 231. Ceylon, *Mrs. Genl. Walker, Thwaites, n.* 2141, *Gardner, n.* 1074.—Var. *proliferum.* St. Helena, *Pritchard, Lady Dalhousie, Cuming, n.* 426, *J. D. Hooker* (elev. 2000 feet). Ascension Island, Green Mountain, on rocks, most abundant (A. stoloniferum, *Bory*), *Bory, J. D. Hooker, Dr. Lyall, Seemann, n.* 2062. Western Tropical Africa, Prince's Island, Bight of

Biafra, *Dr. Curror* (ordinary form, and some specimens larger, with very acuminated pinnæ, approaching *A. harpeodes*). Fernando Po, *Dr. Vogel.* Sierra Leone, Sugar-loaf Mountain, *Barter* (one specimen larger, and with the rachis compresso-alate). Sandwich Islands, rare, *Brackenridge.* Juan Fernandez, *Bertero*, n. 1535, *Cuming*, n. 1332, *Douglas* (greener, pinnæ inciso-lobate).—Var. *harpeodes*, Caracas, *Linden*, n. 197 (one specimen with pinnæ three inches long, finely acuminated from near the base). Venezuela, *Fendler*, n. 137 *and* 135. New Granada, *Schlim*, n. 395 (elev. 10,000 feet) *and* 588. Falls of Tequedama, *Hetton*, n. 63. Tovar, *Moritz*, n. 248. Esmeraldas, Ecuador and Pichincha, *Jameson*, n. 269 (one specimen five inches high, including the stipes, extremely elegant; pinnæ not half an inch long, almost subulate. See fig. 2 of our Tab. CLXXVIII.). British Guiana, *Schomburgk*, n. 1212. Mexico, *Galeotti*, n. 6407, *Müller*, n. 76. Jamaica, *M'Fadyen, Purdie, Wilson.* Tropical W. Africa, *Curror* (proliferous).—Var. *subbipinnatum*, South Africa, British Caffraria, *Capt. Espinasse.* Albany, *Hutton and Atherstone*, in the Tsitzikamma, *Dr. Rubidge* (*Rawson and Pappe*). Grahamstown, *Col. Bolton* (some specimens quite bipinnate; pinnules cuneate incised). Sandwich Islands, *Douglas*, n. 52. Quitinian Andes, Ecuador, Pichincha, *Jameson*, n. 129 (sometimes proliferous). Guatemala, *Skinner* (sometimes proliferous). Jamaica, *Hartweg*, n. 1521.

I am aware how much I must lay myself open to criticism, and perhaps to censure, in differing so much from other very able pteridologists in the limits of a group of supposed species of which I consider the *A. erectum* of Bory as the type. That is a species long known as an inhabitant of Bourbon, afterwards of the Cape; and Schlechtendal, in his valuable 'Adumbratio Filicum in promontorio Bonæ Spei provenientium,' has given a very good figure of it and a very full description, omitting, however, the margined stipes and rachis (a variable character, it must be confessed,) in the figure, and only noticing the former in the specific character, a feature which, when distinctly present, assimilates it with *A. pteropus*, and even *A. alatum*, H.B.K. For a long time I had reason to believe that the S. African *A. lunulatum*, Sw. (*A. falcatum*, Thunb., not of Lam.), was the same, and it had the right of priority in point of name; but though a name very generally retained, no authentic specimen, nor any authentic intelligible description, exists. It was unknown to Swartz and to Willdenow. Schlechtendal, while admitting it in his 'Adumbrationes,' observes, "Species dubia, a nemine post Thunbergium lecta, alteri speciei forsitan suggerenda et quidem sequenti (*A. erecto*), cujus copiose Filicis valde diversæ reperiuntur formæ; inspecto Thunbergii specimine sententiam ferre licebit." I believe the *A. lunulatum* of more recent authors may be rightly considered as more or less marked varieties of *A. erectum*, many of which were believed to be distinct, in consequence of the very widely different countries they inhabit in Asia, Africa, and America!—so that those who maintain the older species (if I may so call them), and concur in abolishing several of the more recent names, are not agreed as to their being united with the one or the other, and none go so far as myself in bringing so many synonyms under one. I must refer to the description at plate 72 of my 'Filices Exoticæ' for copious remarks and more particular localities than it is needful here to give on my var. *proliferum* of *A. erectum*, only observing that I cannot agree with Houlston and Moore in considering it a distinct species.

I have preferred giving the specific character from Mettenius (Fil. Hort. Lips.), believing it to be descriptive of the normal form of the species, and to embrace, as much as a brief diagnosis can do in such a case, the several forms included under it. *A. harpeodes*, if we take the extreme forms, would appear to be well distinguished from our *A. erectum*, but we possess all intermediate gradations, and I agree with Mettenius in placing it here.

84. A. (Euasplenium) *mucronatum*, Pr.; caudex minute rooting, stipites cæspitose ½ an inch to 3 inches long slender

wingless, fronds a span to a foot long elongato-oblong or linear-lanceolate pendulous exceedingly thin-membranaceous pale-green pinnate, pinnæ numerous approximate cordato-ovate acuminate refracted lobato-pinnatifid, lobes ovate mucronate entire, two inferior ones often bi-trilobulate and divaricated, veins simple not extending to the mucro, sori oblong near the costa oblique, rachis green with a distinct but narrow wing.—*Presl, Delic. Prag.* i. *p.* 178. *Hook. Ic. Pl. t.* 917. *Metten. Asplen. p.* 122. A. retortum, *Kaulf. En. Fil. p.* 171. A. lassum, *Raddi, Fil. Bras. p.* 37. *t.* 22 *bis, f.* 4. A. angustatum, *Desv. Mém. Soc. Linn.* vi. *p.* 274 (*Metten.*).

Hab. South Brazil, on the rough trunks of trees, *Chamisso, Pohl, Tweedie, Raddi, Sellow.* Organ Mountains, Rio, *Gardner, n.* 162.—An extremely delicate and well-marked species, peculiar, I believe, to Brazil.

85. A. (Euasplenium) *pulchellum*, Raddi; "caudex ascending, stipites 1–1½ inch long dirty-green at length reddish narrowly marginate, fronds 7 inches long lanceolate or linear acuminate pinnated, pinnæ numerous approximate obliquely or erecto-patent petiolate 10 lines long 2 broad, from an inferior dimidiato-cuneate and a superior truncate base manifestly auricled trapezio-lanceolate subfalcate acuminate or obtuse duplicato-inciso-serrate, pinnatifid or pinnatipartite at the base, auricles incised bearing costular sori or a diplazioid sorus, the teeth acute, veins manifest 1–2 lines apart, the superior lateral ones 6–9, basal ones repeatedly forked, superior ones forked, standing at an angle of 30°, those of the inferior side 3–5 generally undivided, sori 1–1¼ inch long subcurved and subcontiguous to the costa not extending to the margin, involucre membranaceous gradually passing into parenchyma." *Metten. Asplen. p.* 123.—*Raddi, Fil. Bras. p.* 37. *t.* 52. *f.* 2 (*very characteristic*). *Kze. in Linnæa*, ix. *p.* 66. --Var. *Otites*; pinnæ trapezio-oblong obtuse inciso-serrate. *Metten. Asplen. l. c.* A. Otites, *Link, En. Fil. Hort. Berol. p.* 91. *Metten. Fil. Hort. Lips. p.* 74. *t.* 9. *f.* 1–4 (*excellent*).

Hab. Brazil, *Beyrich* (*Metten.*). Rio, *Dr. Lyall.* S. Brazil, *Tweedie.* Peru, *Pœppig.* High mountains, Sierra Nevada de Santa Marta, *Purdie.*—Mettenius alone has given a full specific character of this plant, and he has noticed two forms: one, the original *A. pulchellum*, Raddi, l. c. t. 52. f. 2, exactly corresponds with my specimens from Dr. Pœppig, and is the same as Kunze's plant; the other is the *A. Otites* of Link, of which Mettenius has given an excellent figure in his Fil. Hort. Lips., above quoted: this, likewise, I possess from Brazil. The difference between the two is very considerable, but I can well believe they are the same specifically, for my other specimens are intermediate. It is to be regretted that the distinguishing characters of the species are but slight, and that

its affinities are not pointed out by authors. Kunze alone remarks, "Ab *A. lato*, Sw., quocum Sprengelius, licet dubitanter, conjunxit, abunde differt." Mettenius places it between *A. mucronatum*, Pr., and *dentatum*, with neither of which does it appear to have much affinity.

86. A. (Euasplenium) *depauperatum*, Fée; "fronds cæspitose glabrous pinnato-pinnatifid tender lanceolate in outline virgate at the apex naked rooting, rachis winged bearing pinnæ to the very base, pinnæ approximate pinnatifid, the segments incised acuminate, sori ovoid, indusium tender flaccid, sporangia ovoid, annulus 20–22-articulate, spores episporiate ovoid." *Fée, 7me Mém. Foug. p.* 52. *t.* 15. *f.* 3.—*Metten. Asplen. p.* 123.

Hab. "Bolivia, *Weddell*, n. 4235."—A peculiar-looking plant, judging from the figure; it is otherwise quite unknown to me. It is small, 5 inches high, and the rachis is prolonged 1–2 inches beyond the pinnæ, and is probably viviparous, but quite erect, not, like the rest of the rachis, flexuose.

87. A. (Euasplenium) *dentatum*, L.; caudex a small rooting erect rhizome, stipites tufted 2–6 inches long slender brownish below, fronds subdimorphous (sterile shorter and on shorter stipites) oblong-lanceolate 3–5 inches long pinnate firm-membranaceous green, pinnæ not numerous rather long-petioled more or less patent nearly ½ an inch long rhombeo-ovate or subelliptical or obliquely obovate cuneate at the base obtuse crenato-lobate angled rarely subauricled at the superior base, those of the barren fronds more orbicular, lowest pair more distant rarely 3-lobed or tripartite, veins subflabellately forked, sori 6–8 linear-oblong, involucre pale membranaceous, rachis compressed.—*Linn. Sp. Pl. p.* 1540. *Sw. Syn. Fil. p.* 80. *Willd. Sp. Pl.* v. *p.* 324. *Hook. et Grev. Ic. Fil. t.* 72. *Metten. Asplen. p.* 123 (*excl. syn.* A. Gilliesianum, *Hook.*). *Plum. Fil. t.* 101.

Hab. Tropical America, chiefly in the West Indian Islands. Guadeloupe, *L'Herminier*. Jamaica (where it is called the "Wall-rue"), *Purdie, Bancroft, M'Nab, Dr. Alexander Prior*. Cuba, *Otto*, n. 179; *Wright*, n. 853. Vera Cruz, Mexico, *Linden*, n. 77.—With no very marked characters, and variously shaped pinnæ, this is nevertheless not difficult to recognize. Several of my specimens exhibit dimorphous fronds, having shorter *sterile* ones with shorter stipites, and more orbicular, closer-placed pinnæ; the *fertile* fronds on longer stipites, and with narrower, and often narrow-obovate pinnæ.

88. A. (Euasplenium) *resectum*, Sm.; caudex long-creeping branched about as thick as a goosequill, stipites scattered distant generally (as well as the slender rachis) ebeneous-purple and very glossy sometimes herbaceous and opaque 5 inches to a span long, fronds membranaceous dark-green

4–5 inches to a foot and even 1½ foot long from deltoid-ovate to narrow-oblong acuminate pinnate, pinnæ varying much in number size and shape (terminal ones very small and more or less confluent) subrhombeo-ovate or lanceolate often falcate especially towards the apex acute or even acuminate generally approximate from ½ an inch to 3 inches long more or less inciso-serrate, superior base truncated and parallel with the rachis not auricled, inferior base and sometimes the whole inferior half excised cut off as it were in a straight line or deeply lunate form, so that the costa is in part or nearly wholly close to the inferior margin, veins forked at the superior base two or three times, sori (rarely subdiplazioid) rather numerous small oblong in the superior half, in the inferior few and those towards the apex or none, involucre membranaceous.—*Sm. Ic. Ined. t.* 72. *Sw. Syn. Fil. p.* 80 (*excl. syn. Plum.*). *Willd. Sp. Pl.* v. *p.* 322. *Hook. et Grev. Ic. Fil. t.* 114. *Metten. Asplen. p.* 132. A. amœnum, *Pr. Tent. Pterid. p.* 108. *Metten. Asplen. p.* 131. A. lætum, *Wall. Cat. n.* 209 (*not Sw.*). A. excisum, *Pr. Epimel. Bot.*, *and* A. fraternum, *p.* 74. A. abscissum, *Bl. En. Fil. Jav. p.* 182 (*excl. all the synonyms*). A. obscurum?, *Bl. En. Fil. Jav. p.* 180. A. porphyrocaulon, *Bl. En. Fil. Jav. p.* 182. A. erythrocaulon, *Bl. En. Fil. Jav. p.* 183. A. eroso-dentatum, *Bl. En. Fil. Jav. p.* 182 (*fide specim. in Herb. Nostr.*). A. decurrens, *Wall. Cat. n.* 190. A. unilaterale, *Lam. Encycl.* ii. *p.* 305 (*excl. syn. Plum.*). A. cristatum, *Wall. Cat.* (*large form*). A. serræforme, *Metten. Asplen. p.* 119. *t.* 4. *f.* 13.* A. trapeziforme, *Wall. Cat. n.* 66. *Roxb. Crypt. p.* 497. A. emarginato-dentatum, *Zenk. MS. Kze. in Linnæa*, xxiv. *p.* 263.

Hab. East Indies. Bourbon, *Commerson.* Mauritius, *Bouton, Bojer, Sieber, Syn. Fil. n.* 70; *Fl. Mixta, n.* 300. Ceylon, *Gardner, n.* 1075, 1077, 1038; *Thwaites, n.* 427, 1337, *and* 3269. Nepal, *Wallich, n.* 211, and *Hooker and Thomson.* Sikkim Himalaya, *J. D. Hooker, n.* 169 (small pinnules, much laciniated). Above Simla, *Edgeworth*, and *Col. Bates.* Chittagong and Khasya (large), *J. D. Hooker, n.* 187, elev. 8000 feet. Moulmein, *Thos. Lobb, Parish.* Chippedong, *Wallich, n.* 209. Cochin, *Johnston.* Assam, *Griffith.* Neilgherries, *Zenker* (*Kunze*). Bootan, *Booth, Griffith* (large). Khasya, *Simons* (very large, pinnæ 3 inches, singularly flexuoso-falcate, deeply and lunately excised at the lower base only: *A. cristatum*, Wall.). Mishmee, *Griffith.* Luzon, *Cuming* (large), *n.* 110 *and* 40 (*small*). Java, *Blume* (*large*). Pacific Islands; Oahu, *Barclay.* Feejee Islands; Ovalau, *Milne.* Tropical Africa; Fernando Po, *Barter.*

* I include states of this species with livido-stramineous stipites and with pinnæ exactly agreeing with the figure of Mettenius (*A. serræforme*), believing such to be slight varieties of *A. resectum.*

—As the *Aspl. latum* (our n. 92), the close ally of this species, is peculiar, as far as yet known) to the New World, so is this to the Old World, and it is not to be wondered at that both Wallich and Blume (under the name of *abscissum*) should refer this Fern to the *A. latum*, Schk. It is, however, really distinct, yet very variable; so that the characteristics are not easily defined in words. The caudex is however here unusually long, branched, and creeping, and the pinnæ have not their upper base dilated into a distinct auricle. The figure in 'Icones Filicum' well represents the normal state of the plant.

89. A. (Euasplenium) "*rhomboidale*, Desv.; pinnæ subopposite dimidiate crenate in the superior margin, inferior margin entire, sori 2-3 oblique (almost transverse) with regard to the costa and close to the inferior margin." *Desv. Journ. Soc. Linn.* vi. *p.* 273.—*Metten. Asplen. p.* 133. Aspl. unilaterale, *Lam. Encycl. Bot.* ii. *p.* 305, *in part.* Lonchitis foliis supernis incisis major, *Plum. Fil. t.* 65.

Hab. Martinique, *Plumier*.—Desvaux seems merely to have given a name to a bad figure of some otherwise unknown Fern of Plumier, to which Lamarck had applied a better name, but his description was mainly intended for a Bourbon plant, no doubt *Aspl. resectum*, Sm. The accurate Swartz, indeed, doubtfully quotes Plumier's figure under that species, but its want of creeping caudex forbids the union of the two.

90. A. (Euasplenium) *lugubre*, Liebm.; "stipes 4–6 inches long, frond herbaceous glabrous blackish-green paler and glaucous-green beneath 9–12 inches long 3 inches wide lanceolate attenuate at the apex pinnated, pinnæ alternate horizontal patulous 16–22 on each side shortly petiolate trapeziolanceolate subfalcate obtuse 1–1½ inch long 4–5 lines wide obliquely cuneate at the base above truncated inferior base resected the margin slightly incrassated revolute superior and anterior margin obtusely serrated, serratures emarginate the pinnæ gradually diminishing in size upwards and sessile at length confluent, sori numerous biserial approximate to the slightly prominulous costa, stipes and rachis castaneous shining glabrous slightly flexuose upwards channelled in front, convex at the back, rhizome horizontal fleshy naked (not scaly) emitting numerous strong intricate fusco-villous radicles." *Liebm. Fil. Mex. p.* 91. *Metten. Asplen. p.* 133. *Moore, Ind. Fil. p.* 142.

Hab. Mirador, Mexico, *Liebmann*.—"Differt ab *A. exciso*" (the author surely means *abscisso*, his immediately previous species, for *Aspl. excisum* is a name of Presl for the Indian *A. resectum*, which has a creeping caudex), "cui proxima rhizomate repente nudo, rachi pinnarum non marginata, serraturis irregularibus emarginatis."—The plant is quite unknown to me, as it seems to be to Mettenius and Moore.

91. A. (Euasplenium) *heterocarpum*, Wall.; caudex long

creeping horizontally, young frond-buds clothed with small black subulate scales, fronds sparse but approximate, stipites 4 inches to a span long scaly at the base and as well as the slender rachis purple-ebeneous glossy, fronds oblong or linear-lanceolate 6–12 or 14 inches long much acuminate membranaceous dark-green subtranslucent pinnated, pinnæ very numerous approximate horizontally patent 1–1½ inch long petiolate (ultimate ones very small and decurrent into a pinnatifid acumen) oblongo-lanceolate generally obtuse dimidiate (the lower half as it were cut off parallel with the rachis in a straight line nearly to the apex), superior base truncate parallel with the rachis not auricled superior margin and apex only deeply inciso-serrate, segments bidentate monosorous, veins forked, sori solitary (rarely two) confined to the marginal serratures or segments small oval-oblong, involucre brown membranaceous entire. (TAB. CLXXV.)—*Wall. Cat. n.* 218. *Moore, Ind. Fil. p.* 136. A. cheilosorum, *Kze. in Metten. Asplen. p.* 133. *t.* 5. *f.* 12, 13 (*pinnules only*).

Hab. Nepal, *Wallich*, 1821. Khasya, *Griffith, Hooker and Thomson, n.* 188 *b.* Borneo, *H. Low, Jun.* Moulmeine, *Parish, n.* 13. Ceylon, *Gardner, n.* 27, *Thwaites.*—A most distinct species, very peculiar in the almost entirely dimidiate pinnæ, thus as it were bringing the costa close to the lower margin, and in having the sori apicular on the segments of the superior margin and apex. When there are two sori in the segment, each opens towards the margin. It is remarkable that so few localities are known of this plant, and those for the most part so widely separate from each other; viz. continental India (Nepal and Khasya), and Ceylon and Borneo.

92. A. (Euasplenium) *lætum*, Sw.; caudex small scarcely subrepent, stipites sparsely cæspitose slender 4–6 inches long glossy dark-brown, fronds a span long oblong acuminate membranaceous subtranslucent pinnated the acuminated apex pinnatifid, pinnæ scarcely petiolate numerous horizontally patent the lowest sometimes deflexed 1–1¾ inch long semiovato-lanceolate often subfalcate obtuse or subacuminate, superior base truncate parallel with the rachis auricled or subauricled, inferior base and often for more than half the length of the pinna cut off as it were with a straight or curved line (so that the costa is here close to the margin), the rest strongly duplicato-serrate or incised, veins forked pinnated in the auricle, sori oblong rather distant, involucres membranaceous, in the auricles opening towards the central vein and sometimes diplazioid, rachis brown slightly winged above by the decurrent bases of the pinnæ. (TAB. CLXXIII.)—*Sw. Syn. Fil. p.* 79 *and* 271. *Willd. Sp. Pl.* v. *p.* 317. *Schk. Fil. p.*

65. *t.* 70. *Moore, Ind. Fil. p.* 139. *Metten. Asplen. p.* 135. A. Schkuhrianum, *Pr. Tent. Pterid. p.* 107. *Kl. in Linnæa,* xx. *p.* 355. *Metten. Asplen. p.* 132. *t.* 4. *f.* 15, 16 (*good*). A. abscissum, *Willd. Sp. Pl.* v. *p.* 321 (*in part., fide Metten.*) *Kl. in Linnæa,* xx. *p.* 351. *Moore, Ind. Fil. p.* 108 (*excl.* A. bidentatum, *Kze.*; A. virens, *Desv.*; *and* A. drepanophyllum, *Kze. in Linnæa,* ix. *p.* 56: *fide Metten.*).

Hab. Tropical America; abundant in the West Indian Islands. Jamaica, Trinidad, St. Vincent, Guadeloupe, Dominica, *Dr. Imray,* n. 120; *Sieb. Syn. Fil.* n. 160. Cuba, *Poppig, Otto,* n. 176. Mexico, *Galeotti,* n. 6200; *Linden,* n. 1493. Venezuela, *Fendler,* n. 136 *and* 139 *β.* French Guiana, *Leprieur.* Valley of the Amazon, *Spruce.* Panama, *Seemann,* n. 360, growing on a wall; small, very membranaceous and translucent, stipes stramineous except at the base. Chatham Island, Galapagos, *Capt. Wood, R.N.* Realejo, *Dr. Sinclair.*—We have, unfortunately, no means of ascertaining the exact species intended by Swartz for his *Aspl. latum.* Willdenow copies his specific character and description. Schkuhr does the same, but then he gives a figure of *A. latum,* which appears to me sufficiently to accord with Swartz's description, but to which Willdenow gives a new name, *A. abscissum,* and remarks, "Ab *A. lato* satis diversum pinnis omnibus horizontalibus nec inferioribus deflexis." Now, this direction of the pinnæ is far from a constant character in our *A. latum.* Presl, finding that Willdenow had mixed up two plants in his *A. abscissum,* changed the name of Schkuhr's *A. latum* to *A. Schkuhrianum,* retaining the name of *abscissum* to the other plant (see our *A. firmum,* n. 93). In herbaria and in books the greatest confusion exists as to the names of these two species, although they are truly distinct, so difficult is it to define the characters in words; and the figures not being very characteristic, except indeed the pinnæ of the present species as represented by Mettenius. I give the preference to Swartz's name of *latum.* Swartz compares it with *A. lunulatum* and *A. marinum,* remarking that it differs from both in the longer (generally) acute pinnæ, which are unequally inciso-serrate, "et basi subtus lunatis;" characters well according with our plant. With the former it has affinity, and Swartz especially notices the membranaceous texture of the pinnæ. Its nearest affinity is unquestionably, however, with the *A. resectum* of Sir James Smith, an Oriental plant, whose long creeping caudex at once distinguishes it.

93. A. (Euasplenium) *firmum,* Kze.; scarcely any distinct caudex or rhizome, copious and generally wiry roots (in old plants) proceed from the base of the cæspitose stipites, these latter are from 2 inches to a span long lurid-brown moderately stout, fronds 6–8 inches long oblong or ovate rarely subdeltoid subcoriaceous opaque pinnated, pinnæ 13-20 or more subhorizontally patent superior ones subconfluent and terminating in a pinnatifid acuminated point, pinnæ 1–2 inches long varying from lanceolate to oblong-ovate or oval subdimidiate obtuse or acuminate more or less deeply and duplicato-crenato-serrate, superior base truncated obtuse parallel with the rachis but never distinctly auricled lower base more or less excised sometimes sublunate, veins simple or forked at the superior base subpinnate (rarely bearing a sorus which opens towards

the margin), sori prominent linear, involucres firm-membranaceous, rachis slightly winged above with the decurrent pinnæ. (TAB. CLXXIV.)—*Kze. in Bot. Zeit.* iii. *p.* 283, *in Linnæa*, xxiii. *p.* 304. *Metten. Fil. Hort. Lips. p.* 73. *Moore, Ind. Fil. p.* 130. A. abscissum, *Willd. Sp. Pl.* v. *p.* 321 (*in part., fide Auct.*). *Kl. in Linnæa*, xx. *p.* 351 (*according to the references to Moritz's specimens, n.* 99, *and to the synonyms of Kze. and Pœppig*). *Metten. Asplen. p.* 101. *Moore, Ind. Fil. p.* 108 (*in part, according to several of the references and synonyms*). A. bidentatum, *Kze. Syn. Fil. Pœpp. (non Willd.) Kze. in Linnæa*, ix. *p.* 66. A. salicifolium, *Kze. in Pœpp. Fil. Exsicc. Cub.* A. polymorphum, *Mart. et Gal. Fil. Mex. p.* 56. *t.* 16. *f.* 2 (*small specimen*). A. platychlamys, *Fée, 7me Mém. Foug. p.* 48. *t.* 14. *f.* 3 (*pinnules shorter and very obtuse*). A. Ruizianum, *Kl. in Linnæa*, xx. *p.* 354 *young* (*still younger states of this exactly resemble the* A. minimum, *Mart. et Gal. Fil. Mex. t.* 15. *f.* 4, *which Liebmann refers to* A. pumilum, *Sw.*). Tarachia, *Pr.*

Hab. Peru, *Pœppig* (A. bidentatum, *Kze.*). Columbia, *Moritz, n.* 99 (A. abscissum, *Kl.*), *n.* 360 (A. Ruizianum, *Kl.*), *and n.* 430 (A. firmum, *Metten. Fil. Hort. Lips. p.* 73). Caraccas, *Birschell.* Venezuela, *Fendler, n.* 143 *and* 143 *β*, *and n.* 139 (*young, same as* A. Ruizianum, *Kl.*). Rio Grande, S. Brazil, *Mr. Fox.* Mexico, *Galeotti, n.* 6295. Jamaica, Bluefield Mountains, *Purdie.* Cuba, *Linden, n.* 1881* (two forms larger, pinnæ lanceolate, 2½ inches long, and smaller, with pinnæ oval and very obtuse). Guadeloupe, *L'Herminier* (fronds linear-oblong, pinnæ distant, small). Merida, *Moritz, n.* 360. Venezuela, *Fendler, n.* 139; and Guatemala, *Skinner:* all small forms and young, the *A. Ruizianum*, Kl.—This is, I think, a good species, but, like other *Asplenia*, very difficult of definition on account of its variable pinnæ. It has been in Herbaria confounded with *A. lætum*, Sw. (A. abscissum, *Willd.*, a name still retained by Mettenius, but his synonyms and references show that this is the species intended by him). It differs from that in the less coriaceous fronds, in the absence of distinct auricles, etc. It has also by Kunze been compared with *A. marinum*, which is of a more succulent nature, has auricled pinnæ, and shorter and black stipites. Moore quotes Plumier's Fil. Am., t. 61, under his *A. abscissum*. It may be an exaggerated form of our *A. lætum*, but such figures are little aids to botanists.

94. A. (Euasplenium) *Borneense*, Hook.; stipes short thick furrowed in front 3–4 inches long (perhaps much more when perfect), frond more than 3 feet long 2½ inches broad, subcoriaceo-membranaceous dark-green opaque elongato-lanceolate acuminate? (apex imperfect) long-attenuated below pinnated, pinnæ very numerous approximate almost imbricate at the base spreading nearly horizontally oblong falcate very obtuse

* This number of Linden is quoted by Mettenius, both under *A. Schkuhrianum* and under his *A. abscissum*.

dimidiate below, in the lower half obliquely cuneate into a very short petiole superior base above truncate scarcely auricled but the lower half of the superior margin is inciso-lobate the rest of the superior margin and the apex distantly and obtusely serrated, from below the middle of the frond the numerous pinnæ gradually become shorter and smaller and the lowest ones subpetiolated green scales, veins subfla-bellate nearly erect (not spreading) all parallel, the costa veniform, sori 5–6 parallel with the central vein or costa or nearly so linear not extending to the superior base, in-volucre very narrow firm, costa beneath and stipes slightly paleaceo-setose. (TAB. CLXXXVI.)

Hab. Banks of the Dahumbuy River, Borneo; elev. 2000 feet above the level of the sea, *Hugh Low, Jun., Esq.*—I know of no *Asplenium* which has any near affinity with the present species, of which I regret to possess only one specimen, and that deprived of the extreme apex, and of caudex and of the lower portion of the stipes. But there is enough to show that the species is a very distinct one in form and circumscription, and in the nature of the pinnæ. The general form and size of the pinnæ induce me to place this species in the *Resectum*-group, but their texture (not the colour), and the almost erect and parallel sori, bring it near the *Falcatum*-group. In the very elongated frond, in the very numerous and crowded and almost imbricated pinnæ, and in their gradual diminution in size from below the middle to the base of the frond, it is quite unlike any other species of the genus known to me.

(Trichomanes-*group*. *Type* Aspl. Trichomanes, *L.—Pinnate. Pinnæ among the smallest of the sections, with the inferior base rarely excised as in the* Resectum-*group. Some species, however, border on the smaller of the* Salicifolium-*group; others upon the* Furcatum-*group. Such transition-species are common to all the groups.*)

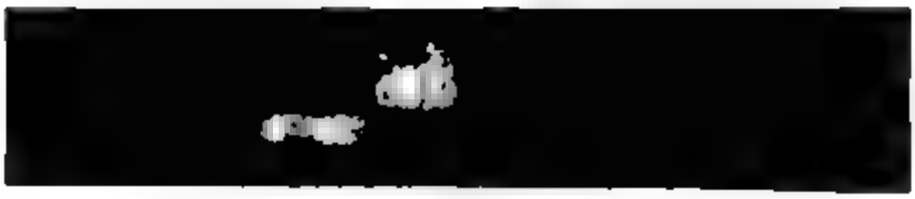
95. A. (Euasplenium) *Trichomanes*, L.; caudex short thick densely fibrous, stipites 1–4 or 5 inches long numerous tufted dark-castaneous or black-ebeneous glossy margined, fronds 4–6–12 inches long linear-lanceolate coriaceo-membranaceous dark dull-green paler beneath pinnated, pinnæ numerous horizontal scarcely petiolate, lower ones distant and smaller, oval or obovate or oval-oblong obliquely cuneate at the base superior base rounded sometimes truncated and even auricu-late sometimes excised at the inferior base, the margin entire or irregularly crenato-serrate, costa subcentral veins few dis-tant oblique generally forked above the middle, sori oblique in two equal series, involucres pale-brown membranaceous entire or jagged.—*Linn. Sp. Pl. p.* 1540. *in part. Huds. Angl. p.* 452. *Sm. Engl. Bot. t.* 567. *Sw. Syn. Fil. p.* 80. *Schk. Fil. p.* 69. *t.* 74. *Hook. Fl. Tasm.* ii. *p.* 145. *A. Gray, Man. Bot. p.* 627. *Metten. Aspl. p.* 138. *Pappe and Raw-*

son, Syn. Fil. Afr. Austr. p. 19. A. trichomanoides, *Cav. Dem.* 257. *n.* 635 (*not Mich.*). A. melanocaulon, *Willd. Sp. Pl.* v. *p.* 332. *Kze. in Pœpp. Fil. Exsicc.* A. Harovii, *Godr.* A. microphyllum, *Tineo* (*fide Metten.*). A. saxatile, *Salisb. Prodr. p.* 403. A. densum, *Brack. Fil. U. S. Expl. Exp. p.* 151. *t.* 20. A. dichroum, *Kze.* (*Moore*). A. heterochroum, *Kze. in Linnæa*, ix. *p.* 67. *Moore, Ind. p.* 136.—Var. *majus. Metten. Asplen. p.* 139; larger in every part. A. anceps, *Sol. MS. Hook. et Grev. Ic. Fil. t.* 195. *Moore, Ind. Fil. p.* 112. Aspl. castaneum, (frond 1 foot to 1½ feet long, involucres numerous, imbricated). *Schlecht. in Linnæa*, v. *p.* 611. *Lieb. Fil. Mex. p.* 88. *Metten. Aspl. p.* 137. *Moore, Ind. Fil. p.* 119.

Hab. Stone walls and rocks, probably throughout Europe, Caucasus, and Tauria. Greece, *Heldreich.* S. Africa, *Ecklon and Zeyher, Atherstone, Drége.* N. S. Wales, Bathurst, Paramatta, etc., *A. Cunningham.* Victoria, *Robertson;* Mount Aberdeen, *F. Mueller* (our common form). Persia, *Fischer.* Ghilan, *Aucher-Eloi, n.* 5486. East Indies, Kashmir, Ladak, Mussoorie, *Dr. Bacon, n.* 15 *and* 32, and Afghanistan, *Griffith*, in the East, through the range of Himalaya to Kumaon, elev. 6–12,000 feet, *Moorcroft* (*Wallich, Cat. n.* 193), *Jacquemont, n.* 1103, *and* 1384, *Colonel Bates* (Simla), *Strachey and Winterbottom, P. Edgeworth, Lady Dalhousie, etc.* Bootan, near Pansa, elev. 7500 feet ("the only specimen"), *Griffith.* N. America, Canada, *Mrs. Percival*, Saskatchawan, thence in the United States to Pennsylvania, *Boott, B. Greene, Dr. Short.* Puget's Sound, British Columbia, N. W. America, *Douglas*, and on the Columbia, on dry rocks. New Mexico, *Fendler, Coll. Pl. Novo-Mexicanæ, n.* 1023. Mexico, rocks, 3000 feet elev.; Condiliera of Guadelajava, *Galeotti, n.* 6444 (this is, according to Moore, 'Index,' the *A. heterochroum*, Kze., a var. with small narrow pinnæ, and a sharp auricle at the superior base). Andes of Peru, *M'Lean* (pinnæ larger, accompanying the more ordinary form of *A. Trichomanes*, but pinnæ more rhomboid). Arid rocks, Ciudad Real, Chiapas, Mexico, singularly rigid, short, with very coriaceous deflexedly imbricated pinnæ with reflexed margins, the whole disc covered with confluent sori, and numerous old rachises from which the pinnæ have fallen, *Linden, n.* 1547. The same form exactly is in my herbarium from the very elevated Andes of Peru, *M'Lean.* Merida, N. Granada, *Moritz, n.* 329, ordinary form (from Dr. Klotzsch, named *A. melanocaulon*, Willd.). Eastern Peru, Mountains on the River Mayo, near Tarapota, *Spruce, n.* 4670 (common form, mixed with specimen having pinnæ half an inch long). Guatemala, *Skinner*, and Quito, *Jameson, n.* 174 (pinnæ with a rather distinct auricle, lowest ones cordato-hastate). Sandwich Islands, on Mouna Roah, *Macrae, Douglas, Brackenridge* ("A. densum"). West Indies. Cuba, *Kze. Pl. Exsicc., Pœpp. in Herb. Nostr.*, and Jamaica, moist rocks near Brokenhurst, Manchester, 3–4–5 inches high, slender, pinnæ more deeply toothed in general, others of the common form, *Purdie.*

Var. majus. Madeira, the Azores, and Canary Islands, frequent. Tropical America, Jamaica, *M'Fadyen, Hartweg, n.* 1522. Cordillera of Orozaba, Mexico, elev. 10,000 feet, *Galeotti, n.* 6254, *Linden, n.* 53. Caracas, Merida, *Moritz, n.* 2192, *Linden, n.* 552 (pinnæ more than half an inch long, subrhomboid). Quitinian Andes, trunks of trees, *Pilzhum* (pinnæ ¾ of an inch long, dimidiato-rhomboid), *Jameson.*

It is not without much labour, and the careful inspection of almost innumerable specimens, and a due regard to the views and expressed opinions of



other writers, that I have brought together such a number of synonyms to this species. So long as *Aspl. Trichomanes* was believed to be an exclusively European plant, a like plant discovered in Canada, in the United States on the summits of the Andes, and on the heights of the great Himalaya range, in S. Africa, and in the Sandwich Islands (and even the common or normal form), was not unnaturally looked upon as something new, partly from want of comparison with European types, and partly from an idea that it was improbable the same plant should be found in localities separated by half the world from its well-known original site. I have myself been led away by such views. Time, and further opportunities of study, may show that I have erred in some of my conclusions, but my fear is that I have not gone far enough, and more complete suites of specimens which are so much to be desired, may present connecting links with some specimens still recorded here as species. I have as much as possible quoted numbers to many localities of publicly (if I may so say) distributed species, which will help to identify many of my synonyms here, as elsewhere. It is probable that not a few names of supposed species inefficiently described, may belong to the present, such as Aspl. Trichomanes, *Thunb. Fl. Jap. p.* 334 (*A. incisum*, *Thunb. in Linn. Soc. Trans.* ii. *p.* 342); Aspl. minus, *Bl. Enum. Pl. Jav. p.* 185, of which the author says, "*A. Trichomanib*, L., distinguitur stipite tereti;" A. pusillum, of *Blume*, *l. c.*, of which he observes, "*A. Trichomanes*, L., differt pinnis numerosioribus obtusioribus et tenuioribus;"—to say nothing of *A. repens*, Desv. in Mém. Soc. Linn. vi. p. 271, from Madagascar, and *A. macrocarpum*, from S. America, Desv. l. c., which, with others not worth the trouble of investigation, are best abolished as totally unworthy of retaining a place in any modern System of Ferns.

96. A. (Euasplenium) *Petrarchæ*, De Cand.; caudex thick subrepent densely clothed with fibrous radicles scarcely paleaceous, stipites cæspitose very crowded 1–3 inches long intensely black-ebeneous glossy and rigid, fronds 2 rarely 3 inches long lanceolate firm-membranaceous pinnate, pinnæ few 9–14 horizontally patent 2–3 lines long petiolate cordato-ovate or oblong obtuse subcuneate at the base pauci-lobato-pinnatifid lobes entire, veins pinnated oblique, sori small 4–6 at length confluent, involucre broad crenate membranaceous, rachis black-ebeneous green in the upper half.—*De Cand. Fl. Fr.* iii. *p.* 328. *Hook. and Grev. Ic. Fil. t.* 152. A. glandulosum, *Lois.* A. pilosum, *Guss.*

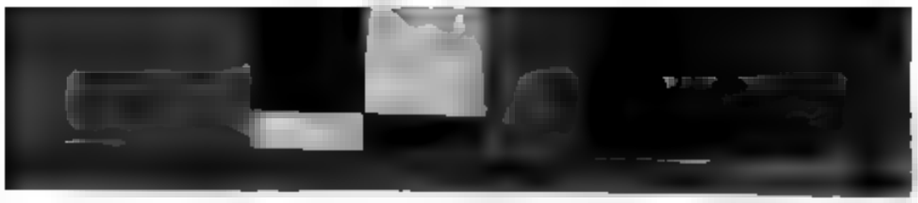
Hab. Europe, rare; S. of France, Montpellier, *Bentham*; Vaucluse, *Requien*; Nice, *Jos. Woods*. Near Toulon, *Bourgeau*, n. 439. Sicily, *Gussoni*, rocks on Mount Catalfano, near Bagheria, *Huet du Pavillon*, *Dr. Alexander Prior*. Clefts of calcareous rocks of Sierra Vernisa, near San Felipe de Xativa, Spain, *Bourgeau*, n. 1693. — Well distinguished from its near affinity, *A. Trichomanes*, by its copious, glandular-tipped hairs, and its pinnæ much more uniform in shape.

97. A. (Euasplenium) *ebeneum*, Ait.; caudex nearly horizontal stout, stipites tufted 3–4–6 inches long and as well as the rachis deep glossy castaneous or black-ebeneous, fronds 6–12 or 16 inches long strict coriaceo-membranaceous lineari-oblongo-lanceolate moderately acuminate pinnated, pinnæ about an inch long rather distant quite sessile trun-

cate at the base and closely set on the rachis horizontal subhastato-lanceolate straight or subfalcate obtuse superior base auricled inferior base sometimes equally so especially towards the lower part of the frond where the pinnæ are shorter and broader, the margins crenato-serrate, veins oblique generally forked, sori oblong short numerous near the costa regular, involucres membranaceous nearly white.—*Ait. Hort. Kew. ed.* 1. iii. *p.* 462. *Sw. Syn. Fil. p.* 79. *Willd. Sp. Pl.* v. *p.* 329. *A. Gray, Man. of Bot. Illustr. p.* 594. *Metten. Aspl. p.* 136. *Pappe and Raws. Syn. Fil. Afr. Austral. p.* 19. Aspl. trichomanoides, *Mich. Fl. Bor. Am.* ii. *p.* 265. Aspl. polypodioides, *Sw. Syn. Fil. p.* 79. *Schk. Fil. p.* 63. *t.* 73. Acrostichum platyneuron, *Linn. Sp. Pl.* 1527.—Var. *minus.* Aspl. parvulum, *Mart. et Gal. Fil. Mex.* 60. *t.* 15. *f.* 3. Aspl. resiliens, *Kze. in Linnæa,* xviii. *p.* 331.

Hab. Rare in Canada, *Mrs. Shepherd.* Apparently frequent throughout the United States, to the extreme south. Some specimens from New Orleans 2 feet 4 inches long, with pinnæ 2 inches long, some of them deeply pinnatifid and nearly quite hastate, with sharp lobes or auricles on each side at the base. West Indies, St. Thomas, *Perrin*, communicated by Dr. Torrey, and is the authority for Sprengel's saying that "*Aspl. erectum*" was found in St. Thomas, by Perrin. Mexico, *Martens and Galeotti;* Valley of Chillo, and on walls of the Hacienda de Arcadia, near Quito, *Hartweg, n.* 1522; Rio Hacha, Sierra Nevada, N. Granada, 10,000 feet elev., *Schlim;* my specimens bear the name of *Aspl. Sellowianum*, Pr. Tent. Pterid. p. 107. S. Africa, *Ecklon and Zeyher, n.* 4631, *Miller, Dr. Alexander Prior.* Grahamstown, *Col. Bolton.* — A well-marked species, long supposed to be peculiar to the United States of America, now found as far south as Quito, and in the eastern districts of the Cape Colony.

98. A. (Euasplenium) *multijugum*, Wall.; caudex erect stout densely fibrous so as almost to appear to be formed of interlaced fibrous roots, stipites very numerous cæspitose 4–6 inches long ebeneous-black glossy as well as the rachis, fronds erect or flexuose and subdecumbent 8 inches to a foot long elongated linear-oblong moderately acuminated sometimes proliferous at the apex rather firm-membranaceous in texture dark opaque green pinnated, pinnæ 12–30 and more pairs horizontally approximate gradually smaller at the apex 4–6–8 lines long falcato-oblong obtuse obliquely cuneate at the base sessile, superior base truncate prolonged into a sharp auricle parallel with and contiguous to the rachis, inferior base cut with a horizontal line which extends nearly the length of the inferior margin of the pinna, the rest superior and the apex crenato-dentate, costa slender veniform parallel with and very near the lower margin, veins distant, superior ones oblique simple or forked, in-



ferior ones few and almost parallel with the costa and margin, sori oblong rather large those above the costa 2–4 or 5 rarely more oblique, inferior ones 1–2 parallel with the costa and margin horizontal, involucres broad. (TAB. CLXXXVIII.)—*Wall. Cat.* n. 207. *Mett. Asplen.* p. 135. A. normale, *Don, Prodr. Fl. Rep.* p. 7. *Metten. Aspl.* p. 136. A. multicaule, *Wall. Cat.* n. 208.—Var. β; pinnæ larger and broader. Aspl. opacum, *Kze. in Linnæa*, xxiv. p. 261.

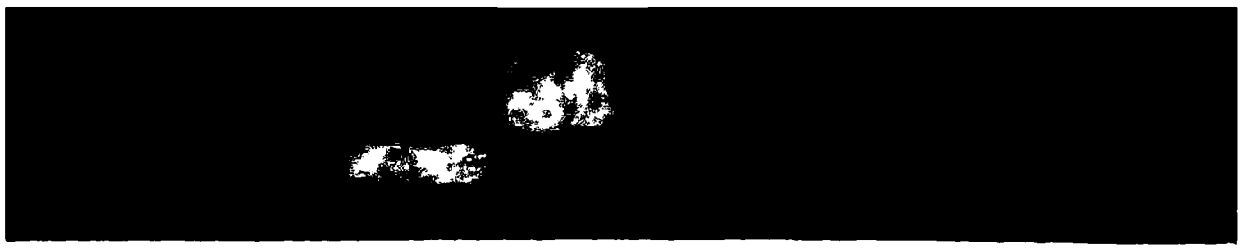
Hab. India, Nepal and Sylhet, near the mountains, *Wallich*. Assam, Khasya, *Griffith, Hook fil. and Thomson*; Sikkim, *Hook. fil. and Thomson*. Neilgherries, *Hohenacker*, n. 911, *Dr Thomson* (var. β). Heights of Peradenia, Ceylon, *Gardner*, n. 1073.—This species, which I believe to be a distinct one, has much of the general aspect of *Aspl. erectum*, especially the proliferous specimens, but is at once distinguished by the glossy ebeneous-black stipites and rachis, and a different arrangement of the sori in fact, its nearest ally is *Aspl. monanthemum*, L., and the chief distinction, besides the softer texture of the pinnæ in the present species, is the number of the sori, which in *A. monanthemum*, as its name implies, are reduced to one (rarely two) on a pinna, and situated near the lower margin. In *Aspl. multijugum* the sori are more frequently above than below the costa, and more numerous. The species seems to be wholly confined to Eastern India and Ceylon, and in those countries to be very frequent. An original specimen of Kunze's *A. opacum* is in my herbarium, and equally authentic specimens of *Aspl. multicaule*, Wall., and they are evidently identical with the same author's *Aspl. multijugum*.

99. A. (Euasplenium) *monanthemum*, L.; caudex short thick densely rooted, stipites densely tufted purple-ebeneous as well as the rachis 2–4–6 inches long, fronds 6–12–18 inches long firm-membranaceous fuscous-green elongato-linear-lanceolate acuminate pinnated, pinnæ numerous ½–¾ of an inch long horizontally patent approximate at length deciduous sessile or very nearly so obliquely semi-oblong straight or falcate obtuse obliquely cuneate at the base, inferior pinnæ shorter and rhomboid, superior base dilated into a short auricle truncate parallel with the margin, inferior base cut off in a straight line half or more the length of the pinna, the rest of the margin crenato-serrate, costa in the lower half very near the margin, veins simple or forked in the auricle, sori very generally solitary and elongated or sometimes 2 rarely 3 confined to the lower half of the pinna close to the margin and parallel with it, upper half rarely with 1–3 oblique sori, involucre often white-membranaceous.—*Linn. Syst. Veget. ed. Murray*, p. 1785. *Sw. Syn. Fil.* p. 80. *Willd. Sp. Pl.* v. p. 323. *Sm. Ic. Ined.* t. 73. *Schlecht. Adumbr.* p. 27. *Webb. Canar. Phyt.* iii. p. 438. *Brack. Fil. U. S. Expl. Exp.* p. 151. t. 20. f. 2. *Mett. Fil.*

Hort. Lips. p. 74. *t.* 9. *f.* 1, 2. Aspl. monanthes, *Linn. Mant. p.* 130. Aspl. inæquilaterale, *Mart. et Gal. Fil. Mex. p.* 57 (*not Willd.*). A. leptophylluin, *Fée, 7me Mém. p.* 50. *t.* 14. *f.* 2 (pinnules smaller). A. blandulum, *Fée, 7me Mém. p.* 51 (*Mettenius*). A. dentex, *Lowe, Nat. Hist. of Ferns, t.* 16. *f.* 2. A. Galeotti, *Fée, Gen. p.* 192. *7me Mém.* 50. *t.* 16. *f.* 2 (common form, pinnæ a little more distant, sori few but often in two series). Aspl. Menziesii, *Hook. et Grev. Ic. Fil. t.* 100. *Metten. Asplen. p.* 136.

Hab. African Islands, Madeira, Canaries, Azores. Tristan d'Acunha, *Carmichael.* S. Africa, Cape of Good Hope, *all travellers.* Abyssinia, *Schimper*, n. 671 (sori solitary, or 3–4 and then in two series), and n. 1274, near Adessula (pinnæ broader, sterile, or with the solitary sorus). Mexico, very abundant, *Mart. et Gal.* n. 6296 (sori rarely in two rows), n. 6479, 6556, 6262, 6446 (Aspl. leptophyllum, *Fée*), n. 6365, 6262; *Hartweg*, n. 410; *Coulter*, n. 1701, 6370, *and* 6369 (Aspl. Galeotti); *Linden*, n. 1557, 1535 (sori generally biserial, the lower 1–2, upper ones 1–4). Guatemala, *Skinner* (sori uniserial, inferior 1–3). Realejo, *Sinclair.* Columbia, *Moritz* (from Mettenius, sori 2–3, always inferior), and 310, *Fendler*, n. 134; *Schlim*, n. 318, *and* 836 (sori in two rows). Bogotá, *Holton*, n. 65. Andes of Quito, *Jameson*, n. 310 *and* 270 (sori in two series, 2–3 in each). Peruvian Andes, *M'Lean.* Chili, *Bridges*, n. 808, at the base and on the trunks of trees; Laguna de Ranco; and *Lechler*, similar situations and same locality. S. Brazil, *Sellow* (from Hort. Reg. Berol.; sori 1–2 at the inferior margin of the pinnule). Sandwich Islands, *Menzies, Dr. Diell, Brackenridge* (common form, and plurisorous).—If this Fern were constant to its name and character of "sorus in qualibet pinna solitarius," it would be readily enough distinguished. Unfortunately that is not the case, for among the numerous specimens in my possession are all intermediate states between the solitary sorus (although so prevalent as to be considered the normal form) to 6 sori, and these arranged in two series, equal or more generally unequal, those at the inferior margin, however, whether solitary or 2 or 3, are horizontal, that is, parallel with the inferior margin. It hence becomes difficult to distinguish these plurisorous specimens from the *Aspl. multijugum*, Wall., and perhaps the utmost that can be said is that in the Indian *Aspl. multijugum* I have never seen a single specimen where all the pinnæ were monosorous, whereas in the African and S. American *A. monanthemum* it is the most general. Our *A. Menziesii* is undoubtedly a plurisorous form of the present species, and Brackenridge has detected the monosorous state at the volcanic crater of true *A. monanthemum*, and figures it so correctly that there can be no mistaking it; and it is not a little remarkable that a state of *A. Trichomanes*, L., nearly approaching to *A. anceps*, Sol. (for to it I refer *A. densum*, Brack.), equally common with *A. monanthemum* in Madeira, Teneriffe, and the Azores, is found in that group of islands. The same author (Brackenridge) figures and describes upon the stipes of this latter plant small, scaly bulbs, "a short distance below the inferior pair of pinnæ, from which spring one or two fronds. By a declination of the stipes, these bulbs throw out roots into the ground, and a new plant is thus formed."

100. A. (Euasplenium) *extensum*, Fée; caudex a small oblong knot (in the solitary instance in my possession), rooting below crowned with subulate scales from which arise 3–4 slender wiry stipites black-ebeneous (as is the rachis) with a downy line at the margins, fronds 1½–2 feet long



(occasionally bearing an axillary branch from a scaly bud), chartaceous linear elongate flexuose, probably procumbent, pinnated, pinnæ distant sessile 3–4 lines long often opposite oval or broad oval very obtuse entire or only obscurely sinuate, the sides equal (in no way dimidiate), costa central, veins few remote simple clavate at the apex a little distant from the sori few irregular oblique oblong small, involucre thin membranaceous.—*Fée, 7me Mém. Foug. p.* 51. *t.* 13. *fig.* 2 (*excellent*). *Metten. Asplen. p.* 138. *Moore, Ind. Fil. p.* 128.

Hab. Andes of Peru, *Mathews*, 1835 (in *Herb. Nostr.*). N. Granada, moist grottoes in forests of Ocaña, elev. 7000 feet, *Schlim*, 1846–52.—A very remarkable and distinct species, two and probably three feet long, with two narrow fringed lines on the ebeneous stipes and rachis, reminding one of those on the stems of *Veronica Chamædrys*, but less conspicuous. Our specimens from Peru are the largest, and subcoriaceous. The singular scaly buds on the rachis, which throw out a young plant (no roots), and seem to form a branch, are analogous to what we have noticed as described by Brackenridge on the stipes of *Aspl. monanthemum* in the Sandwich Islands.

101. A. (Euasplenium) *arcuatum*, Liebm.; "fronds cæspitose herbaceous very glabrous 6–9 inches long (stipes scarcely an inch long) linear-lanceolate towards the apex gracefully arcuate pinnated attenuated at each extremity, pinnæ 4 lines long 2 lines wide sessile densely imbricated horizontal or slightly deflexed alternate subparallelogram, anterior base straight entire, superior truncated straight roundish obtuse obtusely sinuate, superior margin repand, veins conspicuous clavate at the apex terminating within the margin, sori 2 close to the inferior margin parallel and imbricating, stipes and rachis filiform elastic arcuate very black shining plane above convex beneath." (TAB. CLXXXIX.)—*Liebm. Fil. Mex. p.* 89. *Metten. Asplen. p.* 136. A. obtusissimum, *Fée, Gen. Fil. p.* 197 (*according to Mettenius*).

Hab. Mexico, *Sartorius*, "Liebm.," *n.* 28, *Karwinsky* (*Mettenius*), *Galeotti*, *n.* 6446, in part (*Fée*, the same number is referred to by Fée for his *Aspl. leptophyllum*,—our *A. monanthemum*). Rocks in Vera Cruz, elev. 2000 feet, *Galeotti*, *n.* 6299, very scarce; Rincon-faisan, Vera Cruz, *Linden*, *n.* 69.—I have seen no authentic specimen of this plant, but I take a Mexican *Asplenium* of Galeotti, n. 6299, and of Linden, n. 69, to be identical with it, corresponding with the characters given by Liebmann and by Mettenius, sufficiently so to justify me in taking my figures from those specimens. In general aspect and appearance the species is very striking, and though there are slight differences in the more or less entire margins of the pinnæ, yet the specimens gathered by the respective collectors are all identical—the same very short stipites, the same yellow-brown colour of the frond, its linear-oblong form, the close compact, almost exactly parallelogram, very obtuse pinnæ, scarcely at all auricled, the costa occupying nearly the middle of the pinnæ in consequence of

the more equilateral form of the latter. All seem to indicate a species different from *A. monanthemum*, with which Moore unites it, and with which, according to a reference of Mettenius, Kunze seems to have confounded it.

102. A. (Euasplenium) *subavenium*, Hook.; frond (a portion only) a span long lanceolate coriaceo-chartaceous very opaque pinnated, pinnæ ¾ of an inch long numerous approximate horizontal sessile oblong obtuse upper half obscurely serrated cuneate at the base, superior base truncated subauriculate, inferior margin cut off as it were by a straight line, terminal pinna elongated pinnatifid below, costa and veins sunk obsolete, sori 2–6 oblong oblique occupying the disc of the frond between the middle and the apex, involucre firm-membranaceous, rachis ebony-black terete rigid sparsely setose. (TAB. CLXXXI. *B.*)

Hab. Trunks of trees, Madagascar, *Bojer, in Herb. Nostr.*—I possess but a solitary and imperfect specimen of this species, which, however, seems too well marked to allow of my leaving it unnoticed or undescribed. The rachis is ebony-black and slender. The pinnæ are peculiarly rigid and opaque, the veins nearly obsolete, the colour (in the dry state) dirty-brown; the ultimate pinnæ become confluent, and the apex is acuminated. I place it with little hesitation in the *Trichomanes*-group of *Euasplenium*.

103. A. (Euasplenium) *formosum*, Willd.; caudex short stout densely radiculose, stipites very numerous cæspitose scarcely an inch long and as well as the rachis ebeneous with a narrow wing on each side, fronds a span and more long elongato-lanceolate acuminate rigid subcoriaceo-membranaceous blackish-green pinnated, pinnæ an inch long numerous approximate horizontal semiovate subsessile rather obtuse, superior base dilated truncate and parallel with the rachis scarcely auricled, inferior base cut off horizontally, the rest of the margin deeply and pinnatifidly incised, lobes oblong obtuse those nearest the base bifid, inferior pinnæ distant smaller subtriangular, veins simple or forked, sori broad oblique close to the costa, those on the lower side of the costa parallel with the margin.—*Willd. Sp. Pl.* v. *p.* 329. *Schlecht. in Linnæa*, v. *p.* 612. *Hook. Fil. Exot. t.* 16. *Metten. Asplen. p.* 134. *Moore, Ind. Fil. p.* 132. Aspl. subalatum, *Hook. et Arn. Bot. Beech. Voy. p.* 312. *t.* 71. Aspl. odontophyllum, *Wall. Cat. n.* 2216.

Hab. Apparently common throughout tropical America, from Mexico and Guatemala to Brazil and Peru. Numerous special localities are recorded in our 'Filices Exoticæ' and in Moore's 'Index Filicum,' chiefly from our own herbarium. Chatham Island, Galapagos, *Captain Wood, Cuming*, n. 108. Tropical Africa; Congo, *R. Brown, Herb.* (*Moore*). East Indies; Ceylon, on mountains, elev. 3000 feet, *Thwaites*, n. 3487. Madras Peninsula, *Wight*, n. 100, *Beddome*. Nilghiri,

common, *Dr. T. Thomson.*—Here again we have a well-marked species, though it is difficult to say whether it belongs rather to the *Resectum*-group than that of *Trichomanes*, long considered to be peculiar to tropical regions in the New World; more recently detected in tropical Africa and western tropical India. Some of the more simple forms of *Aspl. varians*, Wall., that is, with simply pinnatifid pinnæ, a good deal resemble this, but their more delicate texture, herbaceous stipes, rachis, and fronds, and the equal sides of the pinnæ (not dimidiate), will readily distinguish them. It seems to extend no further eastward in India than Ceylon and the Neilgherries.

104. A. (Euasplenium) *viride*, Huds.; caudices short creeping clothed with black subulate scales forming a closely compacted rooting mass, stipites densely cæspitose 2–4 inches long slender glossy black below then castaneous nearer the fronds stramineous, fronds 3–5 rarely 6 inches long linear-lanceolate membranaceous bright-green (as is the slender rachis) glabrous scarcely acuminated pinnated, pinnæ 2–3 lines long rather distant pinnate all petiolate rhombeo-ovate obtuse more or less obliquely cuneate at the base deeply but rather irregularly crenate scarcely at all lobed, veins subflabellate, sori 2–4 near the disc remote from the margin oblong oblique at length confluent, involucres very thin membranaceous soon obliterated.—*Huds. Fl. Ang. p.* 453. *Sw. Syn. Fil. p.* 80. *Willd. Sp. Pl.* v. *p.* 332. *Schk. Fil. p.* 68. *t.* 73. *Eng. Bot. t.* 392. *Moore and Lindl. Ferns, Nat. Print. t.* 40. *Metten. Asplen. p.* 139. A. Trichomanes, *var.* ramosum, *Linn. Sp. Pl. p.* 1541. A. intermedium, *Pr. Del. Prag.* 1. 233. *Tent. Pterid. t.* 3. *f.* 22. A. umbrosum, *Vill.*

Hab. Throughout Europe, chiefly in mountain or subalpine regions, from Trondheim, in Norway (*Angstrom*), to the Spanish Pyrenees, *Bourgeau, n.* 455. Himalaya, Glacier of Pindari, Kumaon, elev. 12,000 feet, *Strachey and Winterbottom, n.* 5. Rocky Mountains of British North America, *Drummond.*—One of the most delicate and beautiful of European Ferns, confounded by Linnæus with *A. Trichomanes*: long supposed to be limited in its localities, now found in widely remote regions, for there are specimens in my herbarium from the Rocky Mountains in British North America; and equally from the lofty regions of Himalaya. Its nearest affinity is assuredly our next species, *A. fragile*, from the Peruvian Andes.

105. A. (Euasplenium) *fragile*, Pr.; caudex shortly creeping and forming a tufted mass with copious fibrous roots, stipites densely crowded 2–4 inches long slender flexuose lurid-green darker below above often bearing small gemmæ and young plants, fronds 3–4 inches to 1½ foot long thin membranaceous green flexuose pinnated, pinnæ subpetiolate horizontally patent 1–4 lines long subrhomboid

unequally cuneate angled or obtusely 2–3-lobed almost again pinnate sometimes with the lobes (binate or ternate) sharply dentate or mostly entire, veins subpinnate simple or once or twice forked clubbed at the apex, sori oblong oblique remote from the costa and the margin short oblong, involucre broad permanent, rachis slender green.—*Presl, Tent. Pterid. p.* 108. *Kl. in Linnæa*, xx. *p.* 355. *Hook. Ic. Pl. t.* 932. *Metten. Asplen. p.* 125 *and* 139. A. stoloniferum, *Pr. Rel. Hænk.* i. *p.* 44. *t.* 6. *f.* 6 (*not of Bory*). A. tenue, *Pr. Rel. Hænk. p.* 44. *t.* 6. *f.* 5. *Metten. Asplen. p.* 125 *and* 139. A. Peruvianum, *Desv. Mém. Soc. Linn. p.* 271. *Metten. Asplen. p.* 125. A. minutum, *Humb. Herb.*—Var. β, a span to 16 inches long, pinnæ large in proportion entire or rarely ternate. A. fragile, var., *Metten. Asplen. p.* 125. A. rhomboideum, *Brack. Fil. U. S. Expl. Exped. p.* 156. *t.* 21. *f.* 2.

Hab. Andes of Peru, *Hænke*. Chimborazo, *Humboldt*; on rocks, at an elev. of 14,000 feet, *Prof. W. Jameson*. Columbia, *Moritz*, *n.* 326. Mexico, *Ehrenberg* (*Metten.*).—Var. β. Andes of Peru, *Brackenridge*, *M'Lean*. Sandwich Islands, *Diell*, *Douglas*, *n.* 49.—Very nearly allied to *A. viride*, as already observed, but I believe truly distinct: the stipes and rachis are more slender and flexuose, the pinnæ of a more delicate texture, more variable among themselves in figure, with a great disposition to be 2–3-lobed, never with the margin regularly and deeply crenate: and the involucres are permanent. The little bulbs throwing out stoloniferous plants are very remarkable. Although Mettenius had only seen the figure of Brackenridge of his *A. rhomboideum*, he rightly judged it to be a form of *A. fragile*: I have the same also from Peru (*M'Lean*), with fronds a foot long and pinnæ nearly three-quarters of an inch long, almost ternately divided (so as, Mr. Brackenridge says, almost to resemble *A. triphyllum*, Pr., Hook. and Gr.); while, from the Sandwich Islands, I possess specimens nearly a foot and a half long. Probably this should be considered the normal state of the plant, and the original *A. fragile* its lofty alpine condition. Both are equally bulbiferous.

106. A. (Euasplenium) *Quitense*, Hook.; caudex creeping filiform throwing out slender branched fibrous radicles, stipites 3–4 together at rather distant intervals dark-green 1–1½ inch long marginato-alate upwards as is the rather slender herbaceous rachis, fronds oblong-lanceolate 2½–3 inches long pinnate submembranaceous, pinnæ 6–9 pairs 2½–3½ lines long rather long-petiolate horizontal dark-green obliquely subrhomboido-ovate unequally lobate subpinnatifid inferior base cuneato-excised lobes obtuse entire the superior basal lobe the largest and with a deep sinus auriculiform entire or 2–3-lobulate, veins simple or in the auricle once or twice forked clavate at the apex, sori rather large oblong generally one to each lobe, involucre broad membranaceous.—*Hook. in 2nd Cent. of Ferns, t.* 20.

Hab. On decayed trees, forest of Archedona, Andes of Quito, *Jameson*, n. 707. —Of this well-marked species I have only seen specimens from the above locality. The creeping, much entangled, filiform caudex, and the rather deeply lobato-pinnatifid pinnules, and the herbaceous and slightly winged stipes and rachis, will keep it very distinct from any of this group.

107. A. (Euasplenium) *flabellifolium*, Cav.; caudex rather stout short subrepent clothed above with small subulate black scales, stipites cæspitose 2–4–6 inches long flexuose ebeneous brown below, fronds 3–6 inches to a foot (including the long extended naked rachis rooting at the point) or a foot and a half long flexuose decumbent membranaceous bright-green pinnated, pinnæ flabelliform or broad semilunate and deltoid or rhomboid 1 line to ½ an inch long the cuneate base suddenly tapering into a very short petiole or sessile, sometimes a pinna is auricled above and beneath or 3-lobed subentire or more or less serrated, veins flabellate, sori oblique 3–4 on each pinna oblong, involucre pale-brown membranaceous.—*Cav. Demonstr. p.* 257. *n.* 636. *Sw. Syn. Fil. pp.* 81 *and* 273. *t.* 3. *f.* 2. *Willd. Sp. Pl.* v. *p.* 333. *Br. Prodr. p.* 6. *Hook. Ex. Fl. t.* 208 (A. flabelliforme). *Hook. fil. Fl. N. Zeal.* ii. *p.* 33. *Fl. Tasm.* ii. *p.* 145. *Metten. Fil. Hort. Lips. p.* 72. *Asplen. p.* 140.

Hab. Abundant in New South Wales, South Australia, and as far west as Swan River, *Drummond*. Tasmania, equally plentiful; and in New Zealand, Northern Island, and as far south as Banks's Peninsula, *Lyall*, and Akaroa, *Raoul*.—Well distinguished by the generally flabellate pinnæ, the procumbent fronds with the long rachis, naked (or with very abortive pinnæ), rooting at the apex, and producing new plants.

108. A. (Euasplenium) *Gilliesianum*, Hook.; small, caudex minute fibrous paleaceous above, stipites very slender filiform 1–2 inches long stramineous, fronds linear-oblong acuminate very thin membranaceous and translucent pinnated, pinnæ 12–18 distant 2 lines long sessile flabelliform with an unequal cuneiform base unequally and acutely inciso-sublobate, terminal ones very minute narrow cuneate all free, veins flabellately dichotomous, sori 1–3 on each pinna linear-oblong, involucre very thin membranaceous, rachis filiform peculiarly slender flexuose.—*Hook. and Grev. Ic. Fil. t.* 63. A. dentatum, *Metten. p.* 124.

Hab. Fissures of rocks, at Ceno Grande Uspallata, Andes of Mendoza, *Dr. Gillies*.—Dr. Mettenius has probably not had the opportunity of seeing specimens of this plant, nor, one would think, Dr. Greville's admirable figure of it in the 'Icones Filicum,' or he would hardly have referred it as a synonym to the *Aspl. dentatum*, Linn. Its locality is in a widely different country, and its natural

affinity is with *A spl. flabellifolium* of New Holland, and with *A. Kraussii* of Natal: from both of which it is very distinct: as it is also from the *A. viride*, in the form of the pinnæ, which, too, are sessile, and in the singularly slender stipes and rachis, as fine as the most delicate thread.

109. A. (Euasplenium) *Kraussii*, Moore; small delicate, stipes very slender stramineous scarcely an inch long, frond lanceolate tapering below very tender-membranaceous pale-green pellucid pinnate, pinnæ sessile approximate 2 lines long subobliquely cuneate scarcely subflabellate the obtuse truncated or rounded apex strongly serrato-dentate the teeth acute or submucronate, veins remote twice or more forked subflabellate, sori 1 or 2 on each pinna oblong, involucre nearly white thin membranaceous. (TAB. CLXXX. A.)—A. Kraussii, *Moore, Ind. Fil. p.* 124 (*no descript.*). A. dentatum, *Krauss, Fil. Natal. p.* 194. *n.* 25 (*not Linn.*).

Hab. Boschman's Rand, Natal, *Krauss, n.* 25.—The specimen here figured is the only one I possess, and destitute of root and caudex: but it is a well-marked species, though confounded by Krauss with *A. dentatum*, L.

110. A. (Euasplenium) *Sandersoni*, Hook.; caudex a minute rhizome with copious fibrous radicles paleaceous at the summit, stipites tufted 1–2 inches high pale-brownish-green slightly paleaceous below with small lanceolate scales, fronds soft-membranaceous but opaque-green 2–5 inches long lanceolate acuminate spreading the rachis prolonged nearly leafless and gemmiferous at the apex pinnate, pinnæ distant distinctly petiolate 2–2½ lines long obliquely cuneate or subflabellate superior base truncate 3–4-lobed lobes very obtuse, costa excentric parallel with and near to the inferior entire straight margin, veins simple (or at the superior base forked) distant short each terminating within a lobe, sori 2–3 on each pinna oval, involucre pale membranaceous soon obliterated by the copious capsules, rachis compressed green. (TAB. CLXXIX.)

Hab. Ravine in Field's Hill, Natal, *J. Sanderson, Esq.*—A very distinct and new species, with singular obliquely cuneate, subflabelliform pinnæ, decidedly petioled, the lobes nearly equal in size, very obtuse. Its affinity is doubtless with *A. Kraussii*, Moore (A. dentatum, *Krauss, Fil. Natal.* n. 25), but there the frond has terminal pinnæ, the texture is delicate and subpellucid, the petiole is obsolete, the lower pinnæ are dwarfed, the teeth of all are singularly acute, almost mucronate, the stipes and rachis are very slender and filiform.

111. A. (Euasplenium) *pygmæum*, Hook.; minute, caudex a very minute rhizome fibrous below with silky scales above, stipites tufted brown a quarter of an inch long and as well as the slender filiform rachis setose with long hair-like dark-

coloured scales, fronds submembranaceous opaque scarcely more than an inch and a half long lanceolate pinnated, pinnæ 1¼ line long at the utmost obliquely rhombeo-cuneate sessile irregularly dentato-incised teeth obtuse, 3 or 4 of the terminal confluent into a pinnatifid terminal lobe, veins forked, sori . . . ? (TAB. CLXXX. B.)

Hab. Madagascar, *Dr. Lyall.*—This is, I think, the smallest of the Ferns (save in *Hymenophyllaceæ*) with which I am acquainted, and is evidently allied to the *A. Krausii*; differing, however, remarkably in the thicker and darker-coloured frond, narrower and less cuneate or flabellate pinnæ, which have blunter teeth, but especially in the long, setiform, spreading, dark-coloured scales of the stipes and rachis. My only specimen (here figured) is unfortunately attached to the paper with the under side downwards, and I am unwilling to destroy my specimen for the chance of being able to detect the sori. There can scarcely be a question of its genus, and as little of its specific distinction.

112. A. (Euasplenium) *projectum*, Kze.; caudex slender filiform creeping amongst mosses, stipites scattered ½–¾ of an inch long and as well as the rachis extremely slender filiform here and there rooting and at the apex proliferous, fronds prostrate spreading 2 inches long thin-membranaceous 1½ line wide linear-lanceolate acuminate, pinnæ on a very short black petiole 12–16 horizontal scarcely ½ a line broad trapezoideo-orbicular with an obsolete lobe or auricle on the base above, veins short forked or rarely twice forked scarcely extending beyond the centre of the pinna, sori oblong 2–3 on each pinna, involucre white membranaceous. (TAB. CLXXXI. A.)

Hab. Warm rocks, Pompayaca, Peru, *Poeppig.*—If I have mentioned our *Aspl. pygmæum* as among the smallest of Ferns; this is unquestionably among the most delicate, more resembling at first sight a *Jungermannia* than a Fern. My specimens are authentic, being named by Kunze himself: and it does not appear that the plant has been met with by any traveller, save Dr. Poeppig.

(Furcatum-*group.*—*Type* Aspl. furcatum, *Th.*, *or* A. falcatum, *Lam.*, *among the simply pinnated species.*—*Pinnate or bi-tripinnate. Fronds often large more or less compound rigid subcoriaceous frequently turning brown when dry. Veins frequently close and parallel, giving a striated appearance; pinnæ and pinnules approaching to rhomboid or cuneate, generally crouo-dentate; when simply pinnate with rather large pinnæ approaching the* Salicifolium-*group.*)

Pinnate.

113. A. (Euasplenium) *longissimum*, Bl.; caudex stout woody paleaceous with rather long brown lanceolato-subulate scales, stipites and rachis dark lurid-black deciduously villoso-paleaceous, fronds very variable in length 1–3 and more feet elongato-oblong-lanceolate subcoriaceous opaque

dark-brown (when dry) the extremity running out apparently with a continuous growth to a long narrow acumen rooting and bearing young plants at the apex pinnated, pinnæ 3–4 inches long very numerous horizontal sessile moderately distant from a broad ($\frac{1}{2}$–$\frac{3}{4}$ inch) cuneated base lanceolate gradually and much acuminated more or less strongly serrated especially above the middle, superior base with a triangular auricle, inferior base often also auricled or with an angle, inferior pinnæ gradually smaller and very obtuse, veins erecto-patent once or twice forked, sori copious close-placed regular nearer the costa than the margin, involucre subcoriaceous rigid narrow brown. (TAB. CXC.) —*Bl. En. Fil. Jav. p.* 178. *Metten. Asplen. p.* 147. Aspl. flagelliferum, *Wall. Cat. n.* 219 (*where, for* "Sylhet," *read* Sincapore). Aspl. sordidum, *Kze. Bot. Zeit.* vi. *p.* 174 (*fide Metten.*).

Hab. Java, *Blume* (*in Herb. Nostr.*), *Millett.* Singapore, *Finlayson* (*Wallich in Herb. Nostr.*), *Thos. Lobb.* Mergui, *Griffith.* Malacca, *Cuming, n.* 373. Mauritius and Diego Garcia, *Bouton.*—A remarkable plant from the, frequently, great length of the frond, tapering upwards into a long acumen (with small undeveloped pinnæ), which, apparently, does not cease to elongate till the apex, perhaps by coming in contact with the ground, developes a bud, and that throws out roots and new fronds, hence Dr. Wallich's very appropriate name of *A. flagelliferum.* Neither Blume nor Mettenius seem to have been aware of this property. The latter expressly says, "Pinnæ denique (supremæ) abortivæ?," and "Folia apice evoluta non vidi."

114. (A. Euasplenium) *hirtum,* Klfs.; caudex short thick woody scarcely creeping densely clothed with subulate black fringed hair-like scales which are continued on the stipes and rachis and partially on the costæ beneath where they become patent at length deciduous, stipites subcæspitose a span to a foot and more long dull-lurid-blackish rather stout, fronds 1½ to 2 and more feet long lanceolate acuminate coriaceous or stout-chartaceous very opaque brown pinnated, pinnæ numerous approximate lowest ones small remote sessile horizontal, supreme ones gradually smaller and terminating in a pinnatifid acumen, the rest 1–3 inches long lanceolate obtuse or acuminate generally strongly serrated, serratures sometimes unequally bi-tridentate, the superior base truncated and with a more or less distinct auricle, inferior base more or less excised (never auricled), veins erecto-patent simple or once or twice forked, sori copious linear regular nearer the costa than the margin, involucres narrow very firm and rigid brown sometimes black. (TAB. CXCI.)—*Kaulfs. En. Fil. p.*

169. A. pellucidum, *Lam. Encycl.* ii. *p.* 306? (*excl. syn. Plum. t.* 61). *Sw. Syn. Fil. p.* 79. *Willd. Sp. Pl.* iii. *p.* 319. A. stenopteris, *Kze. in Bot. Zeit.* vi. *p.* 174? A. acutiusculum, *Bl. En. Fil. Jav. p.* 178? A approximatum, *Bl. En. Fil. Jav. p.* 179 (*Herb. Nostr.*). A. Torresianum, *Gaud. in Freyc. Voy. p.* 317. A. Meyenianum, *Pr.* (*fide Metten.*).—Var. β; fronds smaller often more obtuse subglaucous beneath singularly firm and smooth and even on the surface.—Var. γ; pinnæ scarcely auricled (hence approaching the normal form of *A. lineatum*). A. plumosum, *Bory, in Willd.* iii. *p.* 323? (*which Moore refers to* A. lineatum). *Metten. Asplen. p.* 148. A. Helsinbergii, *Sieb. Fl. Mixt. n.* 316 (*Herb. Nostr.*).

Hab. Guahan Island, one of the Ladrones, *Chamisso*. Solomon Islands, S. Pacific, *Milne*. Java, *Blume*. Penang, *Millett*, *Lady Dalhousie*, and Madagascar, *Lyall* (var. β). Borneo, Sarawak, *Thos. Lobb*. Banjarmassing, S. Borneo, *Motley* (var. β). Luzon, *Cuming*, n. 147. Mauritius, *Bojer*, *Bouton*, *Sieber* (var. γ). Bourbon, *Carmichael*.—This Fern varies like the preceding, *A. longissimum*, in size, and the form and texture of the pinnæ: and in a few instances I find it difficult (unless the black scaly hairs of the caudex and stipes are present, and these are too apt to be deciduous, except in the caudex, which is seldom present on our herbarium specimens) to distinguish the present species from that. Here, however, I have never seen the upper portion of the frond extended into a proliferous apex, and though in *A. longissimum* the base of the pinnæ is generally auricled on both sides, yet in all my numerous specimens of *A. hirtum* there is never more than one (superior) auricle, and that is sometimes obsolete. Thus, as I believe, the plant becomes the *A. plumosum* of Bory, as it certainly is the *A. Helsinbergii* of Sieber. There is consequently a choice of names. I venture to reject that of Lamarck (*pellucidum*), seeing not only that the name is singularly inappropriate, but the author especially describes the pinnæ as "minces, transparentes," and he refers to the figure of a West Indian plant of Plumier as the same as his, but with which few who know our plant would institute any comparison. The name *A. hirtum* appears unobjectionable. *Aspl. stenopteris* and *acutiusculum*, Bl., seem to me sufficiently to accord with the present species.

115. A. (Euasplenium) *setosum*, Pr.; "fronds elongato-lanceolate pinnated, pinnæ alternate petiolate oblongo-lanceolate acute serrated with setaceous teeth between the serratures, superior base truncate and auriculate, inferior base cuneate, veins bifid, rachis setoso-paleaceous winged above prolonged at the extremity and radicant." *Presl, Reliq. Hænk. p.* 42.—*Metten. Asplen. p.* 148.

Hab. Luzon, *Hænke*.—Unknown apparently except to Hænke and to Presl, who says, "Affine videtur *A. plumoso*, Bory:" and adds, "sori desunt;" yet in his Tent. Pterid. p. 113, he calls it *Diplazium setosum*. *Aspl. setosum*, Desv. Berl. Mag. v. p. 322, from Madagascar, is no doubt something very different from this, and said to be allied to *A. ebeneum*.

116. A. (Euasplenium) *protensum*, Schrad.; caudex stout horizontal copiously rooting paleaceous stipites aggregate

(3–4) terminal from the caudex stout 3–4–6 inches long livid pubescenti-squamulose at length glabrous, fronds 1–2 feet long lanceolate acuminate attenuated below firm subcoriaceous pinnated, pinnæ 1–2½ inches long numerous rather distant horizontal beneath a little pubescent at the base sessile not unfrequently proliferous at the axils linear-lanceolate acuminate obliquely cuneate at the base superior base subtruncated pinnatifid about halfway down, lobes retuse 2–4-toothed the lowest superior one forming generally a cuneate auricle which is bi-trifid the inferior base excised, veins erecto-patulous 1-bifurcate, sori linear almost parallel with the costa generally one corresponding to each lobe." *Schrad. Got. Gel. Anz.* 1818, *p.* 916. *Adumbr. Fil. Cap. p.* 29. *t.* 16. *Kze. in Linnæa*, x. *p.* 513. *Metten. Asplen. p.* 149. *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 18. A. mutilatum, *Kaulf. En. Fil. p.* 171. *Sieb. Syn. Fil. n.* 137. A. porrectum, *Wall. Cat. n.* 224 (*afterwards corrected to* A. polyodon, *Wall.*).

Hab. South Africa, *Mundt and Maire, Drége, Sanderson, Meade.* Natal, *Pappe, Major Garden* (frond more membranaceous). Abyssinia, Simensian Mountains, near Adesula, 1842, *n.* 1264, and 1853, *n.* 611 (pinnæ shorter, more membranaceous, less deeply pinnatifid), *Schimper.* Mauritius, *Wallich* (*in Herb. Nostr.*), *Bojer* (some of the Mauritius specimens resemble the ordinary Cape form: others are more membranaceous).—The accurate Schlechtendal pronounces this to be "distinctissima species," and Kunze "e distinctissimis;" but I confess to possessing specimens from the Cape, and from Abyssinia, and from Mauritius, which, from their smaller and shorter and broader and more membranaceous pinnæ, I have a difficulty in determining whether they belong rather to this plant (*A. protensum*) or to a large form of *A. erectum.* This is especially the case with what Kaulfuss describes as *A. mutilatum*, but which Schlechtendal and succeeding authors refer to *A. erectum.*

117. A. (Euasplenium) *fissidens*, Bory; "fronds striated pinnate, pinnules alternate lanceolato-acuminate, superior base truncate, inferior base deeply cuneato-crenate, crenatures fisso-dentate, sori oblique." *Bory in Belang. Voy. Bot. p.* 49.— *Metten. Asplen. p.* 149. *Moore, Ind. Fil. p.* 130.

Hab. Forests of Mauritius and Bourbon, *Belanger.*—"Large and beautiful species with fronds 2–4 feet long, pinnæ 3 inches long, 6–8 lines wide."

118. A. (Euasplenium) *bissectum*, Sw.; caudex short thick woody clothed with dark-brown broad-subulate sphagnoid scales, stipites 4–6 inches long lurid-brown, frond 12–18 inches long, broad-lanceolate acuminate pinnate, pinnæ moderately distant horizontal petiolate subcoriaceous 2–3 inches long from a broad unequally cuneate base narrow-lanceolate

tapering into a very long narrow coarsely and remotely serrated acumen pinnatifid with rather blunt generally bifid segments, the superior base somewhat truncate and subauricled, the auricle laciniated, veins erecto-patent forked twice or thrice in the auricle, sori on the vein next the costa and parallel with and close to the costa linear, involucres firm rigid. (Tab. CXCII.)—*Sw. Fl. Ind. Occ.* iii. *p.* 1614. *Syn. Fil. p.* 82 (*excl. syn.*). *Willd. Sp. Pl.* v. *p.* 334. *Metten. Asplen. p.* 149. *t.* 4. *f.* 1 *b* (pinna only, *nat. size*). Aspl. dissectum, *Sw. Prodr. p.* 139.

Hab. West Indies, Jamaica, *Swartz. Menzies, M'Fadyen.* Cuba, *Wright, n.* 852. "Columbia, *Moritz, n.* 246."—Mettenius' figure, representing only a solitary pinna, nat. size, is smaller and much less caudate than the majority of my specimens, and scarcely differs from some narrow pinnæ of *A. protensum.* I believe it, however, to be distinct and rare, and almost peculiar to the West Indies. I have not myself seen specimens except from those islands.

119. A. (Euasplenium) *caudatum,* Forst.; caudex nearly as thick as a swan's-quill terete repent,* clothed especially towards the apex with broad-subulate brown sphagnoid imbricated falcate scales, stipites (rachis and indeed whole frond when young villoso-squamose) subaggregate a span or more long dull-lurid-brown, fronds 1–1½ foot long coriaceo-chartaceous broad-lanceolate pinnated acuminated the apex pinnatifid, pinnæ numerous rather remote 2–3–4 inches long petiolate subfalcate from a more or less elongated and obliquely cuneated subrhomboid base lanceolate gradually and long acuminated (caudate), superior base rounded or subauricled scarcely truncate, the inferior more or less excised, the margins very coarsely serrato-pinnatifid, superior serratures entire sharp the rest of the serratures or lobes bifid or (as are the auricles) inciso-serrate, veins erecto-patent mostly forked, sori linear-elongated almost parallel with and near the costa often imbricating in age frequently confluent, involucres firm-membranaceous.—*Forst. Prodr. p.* 80. *Sw. Syn. Fil. p.* 82. *Willd. Sp. Pl.* v. *p.* 335. *Schk. Fil. p.* 72. *t.* 77 (*faithful*). *Bl. En. Fil. Jav. p.* 184. *Moore, Ind. Fil. p.* 119. Aspl.? aureum, *Bl. En. Fil. Jav. p.* 185 (*fide Herb. J. Sm.*). Aspl. truncatilobum, *Fée* (Tarachia, *Pr.*). A. cyatheæfolium, *Bory, in Rich. Voy. Astrolab. Bot. p.* 19. Diplazium cyatheæfolium, *Pr. Epim. Bot. p.* 88 (*fide specim.*). *Cuming, n.* 159. A. multisectum, *Bl. En. Fil. Jav. p.* 185 (*Herb. Nostr.*).

* Mettenius says, "truncus erectus."

Hab. Pacific Islands; Sandwich Isles, *Forster*, *Menzies* (Hawaii), *Beechey*, *Seemann*; Society Islands, *Bidwill*; Lord Howe's Island, Sunday Island, *M'Gillivray and Milne*. Malay Islands; Java, *Blume*, *Thos. Lobb* (one specimen proliferous below the apex); Luzon, *Cuming*, *n.* 99 (small). East Indies, near Serinagur, *Moorcroft*; Khasya, *Simons*, *n.* 237, *Thos. Lobb* (very deeply lobed, the superior basal lobe forming a large, incised auricle). Cochin, *Rev. Mr. Johnston*. Ceylon, *Gardner*, *n.* 1081 (lobes elongated, cut into deep, narrow laciniæ), and *n.* 1340 (ordinary form). N. W. Australia, Brisbane River, *F. Mueller* (lobes shorter than the common form, and insomuch approaching *A. falcatum*).—We are in this, the *Furcatum*-group, engaged in species, perhaps of all Ferns the most variable, so that scarcely any two botanists can be expected to agree as to their limits. The present has often been confounded with *A. contiguum* on the one hand and with *A. falcatum* on the other. The figure of *A. caudatum* in Schkuhr, well represents the normal form of our plant now under consideration.

120. A. (Euasplenium) *horridum*, Klfs.; fronds ample 2 feet and probably much more long nearly a foot wide coriaceous firm very opaque ovato-lanceolate pinnated, pinnæ numerous 5–6 inches long very patent and even recurved gradually smaller towards the apex sessile from an unequally cuneate base which is above truncate and auricled below incised broad linear-lanceolate finely acuminated deeply pinnatifid coarsely inciso-serrate towards the apex, the lobes obovate or cuneate more or less broad often truncate entire or toothed at the apex decurrent below (so that the pinnæ may be said to be pinnate, the pinnules decurrent and confluent, forming a broad winged rachis), veins subflabellate, sori linear oblong a series or chain of them parallel with the rachis, on the disc of the lobes are from 1–4 sori distant from the rachis and opening towards the centre of the lobes, involucre firm brown, rachis very stout sometimes 2 lines wide lurid-brown shaggy with copious long ferruginous somewhat chaffy hairs. (Tab. CXCIII.)—*Kaulfs. En. Fil. p.* 175. *Hook. et Arn. in Bot. of Beech. Voy. p.* 106. *Brack. Fil. U. S. Expl. Exp. p.* 158. *Moore, Ind. Fil. p.* 127. Aspl. truncatum, *Bl. En. Fil. p.* 184 (*and in Herb. Hook.*). *Metten. Asplen. p.* 150.

Hab. Sandwich Islands, Oahu, *Eschscholtz*, *Beechey*, *Brackenridge*. Java, *Blume*.—A very fine and stout species, so large that portions only are gathered by collectors, and I do not find the caudex or stipes to be described by any author. The broad, rigid rachis, shaggy with ferruginous hairs, and the form of the pinnæ and position of the sori, afford abundant characters.

121. A. (Euasplenium) *anisodontum*, Pr.; caudex short stout creeping paleaceous with broad-subulate sphagnoid scales, stipites 3 inches to a span long, "fronds coriaceous oblong-lanceolate pinnate, pinnæ petiolate linear-lanceolate

angustato-acute remotely and acutely dentate cuneato-acute at the base, superior base with a wide tooth" (or auricle) "truncated and unequally toothed at the apex, rachis canaliculate hirsute, veins crowded flabellate, sori oblique to the costa." *Presl, Epimel. Bot. p.* 73. *Metten. Asplen. p.* 150. *Moore, Ind. Fil. p.* 113. Aspl. caudatum, *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 408.

Hab. Luzon, *Cuming*, n. 128. Java, *De Vriese*, *Miquel* (under the name of *A. sororium*).—This is to me a very doubtful species, founded upon Cuming's n. 128, which Mr. J. Smith considers to be the *Aspl caudatum*, Forst., but the pinnæ are not sufficiently deeply lobed for that, and to this Presl has given the name of *anisodontum*. I am more inclined to consider it a var. of *Aspl. falcatum*. The Java specimens are quite the same as mine from Luzon (*Cuming*), and the *A. falcatum, β intermedium*, Brack., may also be looked upon as a connecting link between this and true *A. falcatum*.

122. A. (Euasplenium) *nigrescens*, Bl.; "fronds pinnate membranaceous glabrous, pinnæ petiolate lanceolate long-acuminate, superior base subauriculato-truncate, inferior base abscisso-cuneate inciso-serrate striated, sori remote subcontiguous to the costa, stipes and rachis subterete glabrous." *Bl. En. Fil. Jav. p.* 180. *Kze. Bot. Zeit.* vi. *p.* 173. *Metten. Asplen. p.* 151. *Moore, in his Ind. Fil. refers here the* Aspl. heterodon, *Moritz* (*not Bl.*).

Hab. Moluccas, upon trees, *Blume*. Java, *Zollinger*, n. 1994.—I have seen no authentic specimens of this *Asplenium*: the author of the species says of it, "Simillimum precedenti (*Aspl. heterodon*, Bl.), pinnis autem basi deorsum abeciseo-cuneatis situque sororum diversum." Kunze compares it with *Aspl. Serra*.

123. A. (Euasplenium) *progrediens*, Fée; "fronds pinnate oval-lanceolate, stipes reddish slender or robust grooved glabrous as well as the rachis, rhizome abundantly clothed with narrow scales which are almost capillaceous netted and of a vinous colour, pinnæ pedicellate lanceolate unequally toothed teeth coarse and obtuse incised at the base entire or oblique, terminal one much larger than the others and more or less lobed below, sporothecia narrow imbricated appearing near the costa the summit sterile." *Fée*, 8*me Mém. Foug. p.* 81.—*Metten. Asplen. p.* 151. *Moore, Ind. Fil. p.* 157.

Hab. Mexico, at Huatusco and at Orizaba, n. 54 and 449, *Schaffner*.—No notice is taken of the affinities of this species.

124. A. (Euasplenium) *Serra*, Langsd. et Fisch.; caudex stout repent clothed with dark-brown falcate subulate scales copiously rooting, stipites remote about a foot long lurid-brown, fronds ample 2–4 feet long coriaceo-chartaceous somewhat glossy olive-green or brown ovato-lanceolate pin-

nated, pinnæ short petiolate subhorizontal numerous 4–6 inches and more long from a broad unequally cuneate base lanceolate much and finely acuminate sharply and unequally serrated and often duplicato-serrate, the superior base rounded, inferior subexcised, veins pellucid copious forked 2–3 times erecto-subpatent, sori linear close to and generally parallel with the costa rarely oblique eventually prominent and confluent, involucre rigid membranaceous.—*Langsd. et Fisch. Fil. p.* 16. *t.* 16. *Willd. Sp. Pl.* v. *p.* 312. *Metten. Asplen. p.* 151. A. woodwardioides, *Gardn. Lond. Journ. of Bot.* A. Pœppigii, *Pr. Tent. Pterid. p.* 106. *t.* 3. *f.* 21. A. insigne, *Liebm. Fil. Mex. p.* 94.—Var. *β. Imrayanum;* pinnæ bright-green (smooth and even when dry) 6–10 inches long sometimes nearly 2 inches wide, sori often an inch long oblique with the rachis.

Hab. Tropical America; Brazil, *Langsdorff*, *Gardner*, *n.* 43 (A. woodwardioides, *Gardn. n.* 174, 175), 5309, 5312, 5938, and 5939, *Barclay*, *Wm. Lobb*; S. Brazil, *Sellow.* British Guiana, *Richd. Schomburgk.* W. Indies; Jamaica, *Wilson*, *Purdie*; Cuba, *C. Wright*, *n.* 840; Guadeloupe, *L'Herminier.* Caraccas, *Linden*, *n.* 191, and 553, *Birschel.* Venezuela, *Fendler*, *n.* 332. Ocaña, *Schlim*, *n.* 321. Santa Marta, *Purdie.* Ecuador; Pillzhum, elev. 12,000 feet, *Jameson.* Peru, *Mathews*, *n.* 1852. Central America, *Barclay.* Realejo, *Dr. Sinclair.*—Var. *β. Imrayanum.* Dominica, *Dr. Imray* (frond 5 feet long, stipes and rachis ebeneous).* Venezuela, *Fendler*, *n.* 155. Mexico, *Hartweg*, *Liebmann.*—The close and parallel proximity of the sori with the costa is not constant, though very general in this fine species: in our finest specimens with the broadest pinnæ the sori are more oblique. The state called by Gardner *Aspl. woodwardioides*, has the sori very close to the costa, and the pinnæ less deeply serrated, and the texture firmer than usual.

125. A. (Euasplenium) *decrescens*, Kze.; "frond coriaceous firm sparingly paleaceous beneath opaque discoloured shortly ovato-oblong acuminate pinnated, pinnæ patent from an entire base truncated above and subauricled beneath oblique or excised trapezio-lanceolate acuminate duplicato-serrulate striated the lower not smaller, sori contiguous to the costa, rachis and stipes of middle length flexuose paleaceo-hirsute livid-brown, rhizome horizontal stout densely nigro-paleaceous radicose." *Kze. in Linnæa*, xxiv. *p.* 261.—*Metten. Asplen. p.* 142. *Moore, Ind. Fil. p.* 123.

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* We have living plants of this in our stoves from Dr. Imray, and it seems to sport remarkably. Many of the pinnæ are on petioles ¾ of an inch long and of all kinds, hatchet-shaped, falcato-recurved, the inferior base excised for half the length of the whole pinna, bifid, or with an auricle so large as to be almost equal to the rest of the pinna, the margins very deeply inciso-serrate, the sori variously scattered, etc.

Hab. Neilgherries, "*Schmidt*, n. 99 and 122."—"From its near ally, *A. vitiense*, Sw., this differs in the thicker and more opaque frond paleaceo-hirsute beneath, especially at the base of the pinnæ, pinnatifid at the apex; the pinnæ less caudate, at the base beneath less dilated, sparingly and slightly serrated more distinctly striato-venose, rachis and stipes paleaceo-hirsute. Fronds 8 inches long and 5 wide. Stipites 3-6 inches long, very flexuose."—Quite unknown to me.

126. A. (Euasplenium) *contiguum*, Klfs.; "fronds pinnate, pinnæ linear-lanceolate attenuate inciso-serrate, serratures toothed, the superior base rotundato-cuneate subauriculate inferior abscisso-attenuate, sori contiguous parallel with the costa, caudex repent, stipes 6 inches long, frond equally long, pinnæ an inch and a half to 3 inches." (TAB. CXCIV. Fig. 1.) *Kaulf. En. Fil. p.* 175. *Hook. et Arn. in Bot. of Beech. Voy. Brack. Fil. U. S. Expl. Exp. p.* 158. *Metten. Asplen. p.* 152. *Moore, Ind. Fil. p.* 121.—Var. *filiforme*; pinnæ more deeply inciso-serrate elongated at the apex into a long filiform point. Aspl. filiforme, *Kaulf. En. Fil. p.* 172. *Hook. et Arn. in Bot. of Beech. Voy. p.* 106. *Metten. Asplen. p.* 152. *Brack. l. c. p.* 158. A. contiguum, *β* filiforme, *Moore, Ind. Fil. p.* 121. (TAB. CXCIV. Fig. 2, 3, 4.)—Var. *lepturus*; pinnæ larger very deeply inciso-serrate 5–6 inches long gradually tapering into a very long narrow acumen. (TAB. CXCIV. Fig. 5.)—A. lepturus, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 408 (*name only*). *Presl, Epimel. Bot. p.* 72. *Metten. Asplen. p.* 152. Aspl. contiguum, *β* filiforme, *Moore, l. c.*

Hab. Oahu, Sandwich Islands, *Chamisso, Beechey, Diell* (sub nom. A. filiforme, *Klf.*).—Var. *filiforme*. Oahu, *Chamisso, Beechey*. Var. *lepturus*. Luzon, *Cuming*, n. 211. Neilgherries, *Gardner*.—*Aspl. contiguum* is a Sandwich Island Fern, established by Kaulfuss and retained by most botanists since his time, and we are under the great disadvantage of not being able to have recourse to authentic specimens to form an exact idea of the precise *Asplenium* the author had in view. Add to which, his very brief description appears to have been drawn up from a solitary frond only 6 inches long, with pinnæ from 1½ to 2 inches only long. His *A. filiforme* is now generally allowed to be the same species having pinnæ 4 inches long. Under such difficulties I can only offer the figure (Fig. 5) of a pinna of a Fern from Oahu, which agrees sufficiently with, and I believe is the same as, Kaulfuss's, of which I have some specimens with pinnæ 2 inches long, others 4 inches. I represent at Fig. 2, 3, 4, the *A. filiforme* of Kaulf., which is intermediate between *A. contiguum* and *A. lepturus* (Fig. 5), of which pinnæ are represented at Fig. 6, 7, and this again borders so closely upon some states of *A. falcatum* (and I may add two of *A. caudatum*), that I know not how any real line of distinction can be drawn. It is remarkable that notwithstanding the rich harvest of Ferns made by Mr. Brackenridge in the Pacific, and especially the Sandwich Islands, he does not acknowledge any *A. caudatum*, from which I infer that the smaller forms of it he would be likely to unite with *A. contiguum* (of which he says, "Very closely allied to *A. falcatum*") or to *A. falcatum* itself, which he tells us occurs frequently on all the groups of islands in the Pacific Ocean. If as variable as in the numerous specimens in our herbarium, and as shown in our TAB. CXCIV, he has good authority for such a measure.

It is to be regretted that we have no expression of opinion on the validity or otherwise of the present species, *A. contiguum*, by such experienced pteridologists as Mettenius, Moore, and J. Smith. Moore has done the next best thing by giving some reference to specimens that have been largely dispersed with numbers. Thus he refers for *A. contiguum* (normal form) to "Peradenia Collection" of Mr. Thwaites, *n.* 3140. I possess no number so high as that, but I have No. 1340, which is a small state of what I consider *A. falcatum;* and No. 1072 of *Gardner* (Ceylon) "in part," of which I have copious original specimens, all very uniform, and which I refer, as Mettenius does, to *A. falcatum:* they have shorter pinnæ than is usual to that species.

127. A. (Euasplenium) *nitens*, Sw.; caudex thick creeping clothed in the young portion with imbricated broad subulate sphagnoid scales, stipites sparse a span to a foot long stout castaneous glossy glabrous, frond 1½–2 feet long chartaceo-membranaceous striated with veins broad-lanceolate pinnated pinnatifid at the apex, pinnæ horizontal petiolate 4–5 inches long from a broad obliquely cuneate base lanceolate much and caudately acuminate unequally inciso-serrate deeply and sharply serrate above the middle, superior base rounded inferior excised with an arcuate line, lower pinnæ gradually shorter more remote two lowermost pair quite sessile an inch long broad rhombeo-ovate very obtuse closely and finely serrated, veins copious closely approximate erecto-patent several times dichotomous (flabellate and barren in the lowest pairs of pinnæ), sori approximate to and parallel with the costa linear-elongated, involucres firm brown, rachis castaneous glabrous. (TAB. CXCV.) —*Sw. Syn. Fil. p.* 421 *and* 264. *Bojer, Hort. Maurit. p.* 396. *Willd. Sp. Pl.* v. *p.* 326. Aspl. macrophyllum, *Lowe, N. Hist. Ferns*, v. *t.* 42 (*not Swartz*).

Hab. Isle of France, frequent; all travellers, *Sieber, Syn. Fil. n.* 65, and *Fl. Mixta, n.* 321. Bourbon (*ex Herb. Mus. Par.*).—A most distinct and very handsome species, peculiar (as far as at present known) to Mauritius and Bourbon, and there very plentiful. The glossy (when dry dark-brown) papyraceous pinnæ are remarkable, and, however variable in breadth towards their base, from half an inch to an inch, the two lowest and remote pair of pinnæ are always quite altered in form, short, sessile, cordato- or orbicular-rhomboid, sterile, and with flabellate venation. *Aspl. Serra*, in some of its states, has much resemblance to *A. nitens*, but the pinnæ are more coriaceous, more strongly serrated, and it altogether wants the peculiar inferior pinnæ of the frond.

128. A. (Euasplenium) *simile*, Bl.; "fronds pinnate coriaceous glabrous, pinnæ petiolate elongato-lanceolate long-acuminated subunequally cuneate at the base unequally and sharply serrated striated, rachis and stipes subterete glabrous." *Bl. En. Fil. Jav. p.* 181. *Metten. Asplen. p.* 153. *Brack. Fil. U. S. Expl. Exped. p.* 152?

Hab. On trees, Java, *Blume*, Luzon, *Brackenridge?* "Valde simile *Aspl. falcato*, Lam., et *Aspl. nitenti*, Sw., ast serraturis frondis distinctum," *Bl.*—This is all that is recorded of the species: it may probably be looked upon as a form of the protean *A. falcatum*.

129. A. (Euasplenium) *macrophyllum*, Sw.; caudex repent stout paleaceous with subulate sphagnoid dark-brown scales, stipites 4–5 inches to a foot long lurid- or greenish-brown deciduously paleaceous, fronds 8–10 inches to a foot and more long broad-ovate coriaceous firm reddish-brown when dry pinnate, pinnæ 3–5 to 24–25 petiolate horizontal from a broad cuneate base trapezio-ovate or broad-lanceolate gradually tapering into a more or less elongated acumen 3–5–6 inches long undivided or with one or two sharp lobes especially the superior ones from 1–3 inches broad in the broadest part, superior base rounded, inferior excised in a straight line unequally and slightly or deeply inciso-serrate straight or falcate striated with venation, terminal pinna often much larger than the rest bifid or trifid, veins numerous crowded parallelo-radiate several times forked, sori very long in the large pinnæ as long as the veins 2–3 inches, involucres very narrow firm. (Tab. CXCVI.)—*Sw. in Schrad. Journ.* 1800, ii. *p.* 52. *Sw. Syn. Fil. p.* 77 *and* 261. *Willd. Sp. Pl.* v. *p.* 311. *Metten. Asplen. p.* 155. *Moore, Ind. Fil. p.* 143 (*excl. syn. Lowe, t.* 42, *which is* A. nitens). A. intermedium, *Kaulf. in Sieb. Syn. n.* 68. *Bl. En. Fil. Jav. p.* 181. A. Kaulfussi, *Pr. Tent. Pterid. p.* 106. A. canaliculatum, *Bl. En. Fil. Jav. p.* 180. A. coriaceum, *Roxb. Crypt. Fil. p.* 497. A. Finlaysonianum, *Wall. Cat. p.* 101. A. megalophyllum, *Desv. in Mém. Soc. Linn.* vi. *p.* 275. A. platyphyllum, *J. Sm. Hook. Journ. Bot.* iii. *p.* 408 (*name only*). A. oxyphyllum, *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 408 (*name only*). *Kze. in Bot. Zeit.* vi. *p.* 441. *Hook. in Kew Gard. Misc.* ix. *p.* 342.—Var. *urophyllum*; pinnæ broad-lanceolate long-caudate. (Tab. CXCVII.)—A. urophyllum, *Wall. Cat. n.* 192. *Metten. Asplen. p.* 153. A. Tavoyanum, *Wall. Cat. n.* 1035.

Hab. Mauritius, *Grandal* (*Sw.*), *Bouton in Herb. Nostr.*, *Sieber*, *n.* 68 (my only specimen from this locality is the state with narrower pinnæ). Malay Islands, Java, *Blume*, *Zollinger*, *n.* 151. Singapore, *Lobb.* Penang, *Finlayson*, *G. Porter* (pinnæ caudate at the apex, deeply inciso-serrate). Luzon, *Cuming*, *n.* 42. Malacca, *Cuming*, *n.* 375; and Mishmee and Tavoy, *Griffith*. Borneo, Sarawak, *Thos. Lobb*, *Wallace*; Banjarmassing, *Motley*, *n.* 581. New Guinea, *Hinden*. Jobie Island, *Barclay*. Sumatra, *Teschemacher* (same form as *Gardner*, *n.* 1072, from Ceylon). Feejee Islands, *Milne*, *n.* 193, 155; and Solomon's group, *n.* 522 (several of the specimens deeply inciso-serrate). Pig Island, Louisiade, *M'Gillivray* (*Voy. of the Rattlesnake*). China; Hongkong, *C. Wright*, *Harland*. Bonin

Isles, *C. Wright*. Assam, *Simons*. Cochin, *Johnston*. Ceylon, *Mrs. General Walker* (pinnæ long, caudate, narrow, petioles two lines long), *Gardner*, *n.* 1072 (small pinnæ, ovato-lanceolate, rachis rooting and proliferous at the summit).—Swartz has well described this species from Mauritius specimens, where, however, judging from the few I have received from thence, it does not appear to be so plentiful as in the more intratropical Malay and Pacific Islands: and yet Brackenridge does not seem to have met with it. To say that it is a variable species is saying nothing more than what is common to most Ferns. My finest specimens from Borneo (*Motley*) have pinnæ nearly 7 inches long and 2½ to 3½ inches wide, while others have pinnæ 1–2 inches long and ⅛ to ¼ of an inch wide: and yet the species is easily recognized by the generally undivided, rarely 3-cleft or 3-fid, pinnæ, their peculiarly firm and hard, yet scarcely coriaceous texture, copious veins, and numerous, much elongated, linear, very narrow sori, radiating as it were from the costa towards the margin, sometimes occupying the whole length of the veins.

130. A. (Euasplenium) *Neeanum*, Kze.; "frond ovate pinnate, pinnæ subtrijugate nearly opposite trapezio-ovate or lanceolate serrated acute subauricled, auricle serrulate entire at the cuneate base decurrent into a short petiole beneath and upon the margined rachis paleaceous, sori very long and parallel." *Kze. Annal. Pteridogr. p.* 22. *Metten. Asplen. p.* 154. *Sturm, En. Fil. Chil. p.* 28. *Gay, Fl. Chil.* vi. *p.* 500.

Hab. "Island of Chiloe, S. Chili, *Née, in Herb. De Cand. et Kze.*"—I cannot but fear there is some error in the locality of this plant, which, Kunze says, "ad *A. Finlaysonianum*, Hook. et Grev. Ic. Fil. t. 136 (nunc *Hemidictyon Hookerianum*, Moore) accedit; quod vero pinnis subquinque integerrimis acuminatis utrinque glabris distinguitur." That Asplenioid plant, however, and its allies, with the "sori longissimi," are quite tropical and Malayan plants, not likely to inhabit a region so far south as Chiloe. Nor does any of the many Chilian travellers, since the time of Née, appear to have detected it. Mettenius suggests that Née's plant may be the same as *A. oxyphyllum*, Wall. (A. macrophyllum, *Sw.* and of us), and this may very well be if we allow of an error in the given locality of the plant.

131. A. (Euasplenium) *dimidiatum*, Sw.; caudex short thick inclined densely rooting paleaceous above with dark-brown almost black subulate scales, stipites 4–6 aggregated a span to a foot high dark lurid-brown and as well as the rachis more or less paleaceous, frond a span to a foot long and more ovato-oblong acuminate firm-coriaceous pinnate, pinnæ petiolate erecto-patent 12–21 trapezio-oblong or subovate obliquely cuneate at the base, superior base rounded scarcely subauricled, inferior excised, serrated irregularly and sometimes very deeply incised generally unequally bifid, the segments very acute and pungent superior margin irregularly and pungently serrate, no distinct costa, veins copious compact radiating several times forked, sori also radiating linear-elongate, involucre narrow firm-membranaceous opening towards the centre or costal vein of the pinna.—*Sw. Fl. Ind. Occ.*

iii. *p.* 1715. *Sp. Fil. p.* 77. *Willd. Sp. Pl.* v. *p.* 327. *Metten. Fil. Hort. Lips. p.* 17. *t.* 13. *f.* 22. *Asplen. p.* 155. *Moore, Ind. Fil. p.* 124. Aspl. zamiæfolium, *Willd. Sp. Pl.* v. *p.* 325. *Pr. Reliq. Hænk.* i. *p.* 43? *Kunze, Fil. Schk. Suppl. p.* 103. *t.* 48 (*excellent*). *Loddiges, Bot. Cab.* ix. *t.* 854. Aspl. caryotoides, *Pr. Tent. Pterid. p.* 107. Tarachia, *Pr.*

Hab. West Indian Islands: Jamaica, *Swartz, M'Fadyen, Wilder.* Cuba, *C. Wright*, n. 842. Venezuela, *Birschel.* New Granada, Ocaña, 7,000 feet, *Schlim*, n. 619. Peru, Province of Chacapoyas, *Matheus*, n. 3298. Tropical Africa, Fernando Po, growing on Oil Palms (*Elais*), *Barter, Niger Exped.* –A well-marked species, with a peculiar habit, and yet no two pinnæ are exactly alike. The Fernando Po specimens are less pungent or cuspidate in their laciniæ; but not otherwise different.

132. A. (Euasplenium) *falcatum*, Lam.; caudex repent stout more or less clothed with dark-brown sphagnoid scales, stipites 6–10 inches long lurid-brown, and as well as the rachis deciduously villoso-paleaceous, fronds 8–10 inches to 2 feet long subcoriaceous ovato-lanceolate pinnate, pinnæ horizontal rather long-petiolate 4–6 inches and more long from a broad obliquely cuneate base ½–¾ of an inch broad lanceolate much and often finely caudato-acuminate lobato-pinnatifid the segments pointing upwards, superior base the broadest subauricled general acute and as well as other of the inferior lobes serrated, inferior base excised, towards the apex the lobes are reduced to rather large remote serratures, veins approximate erecto-patent with forked branches, sori long-linear numerous diverging from near the costa in the direction of the veins to near the margin giving a striated appearance to the pinnæ, involucres narrow firm-membranaceous.—*Lam. Encycl.* ii. *p.* 306. *Sw. Syn. Fil. p.* 77. *Willd. Sp. Pl.* v. *p.* 325. *Br. Prodr. p.* 180. *Kze. Bot. Zeit.* vi. *p.* 173. *Metten. Asplen. p.* 156. *Moore, Ind. Fil. p.* 128. *Endl. Prodr. Fl. Norf. p.* 9. *Brack. Fil. U. St. Expl. Exp. p.* 157. *t.* 22. *f.* 1 (called var. *attenuatum*, but it is a very good representation of an ordinary form). Aspl. polyodon, *Forst. Prodr. p.* 80. *Sw. Syn. Fil. pp.* 77 *and* 263. *Hook. Fil. Fl. N. Zeal.* ii. *p.* 34. *Lowe, Nat. Hist. of Ferns*, v. *t.* 39 *B. Metten. Asplen. p.* 156. Aspl. zamiæfolium, *Pr. Reliq. Hænk.* i. *p.* 43? *and* Tarachia Hænkeana, *Pr. Epim. Bot. p.* 76 (*Moore*). Aspl. cultratum, *Gaud. in Freyc. Voy. Bot. p.* 317. —Filix non ramosa Zeylanica, etc., *Burm. Zeyl. p.* 47. *t.* 43 (a rough figure, but very accurate).—Var. *firmum*, *Moore, Ind. Fil. p.* 129 (fronds stouter, pinnæ thicker, sori shorter,

costal. Aspl. firmum, *Fée, Gen. p.* 191, 197. A. falcatum, *Roxb. in Beatson's St. Helena Pl. p.* 299.

Hab. Ceylon (*Lamarck*), *Mrs. Genl. Walker*, *Gardner*, n. 1080. Courtallam and Travancore, Madras Peninsula, *Wight* (*Wall. Cat.* n. 2214; "A. cultrifolium, *Roxb. Herb.*"). Mauritius, *Wallich*, *Cat.* n. 225. Bourbon (*ex Herb. Mus. Paris.*). On trees, Tavoy, *Parish* (two specimens much resembling *A. macrophyllum*, but too much lobed; another with the pinnæ more than usually entire). Moulmein, *Thos. Lobb* (habit and colour like *A. macrophyllum*, but leaves lobed as in *A. falcatum*, 7 inches long, much acuminated). Pig Island, Louisiade, *M'Gillivray*. Friendly Islands, *Harvey*, *Menzies*. Sandwich Islands, Oahu, *Dr. Diell*, *Bennett* (very small, whole plant not 4 inches high). Pitcairn Island, *Cuming*, n. 1384 (lobes of the pinnæ nearly entire and rounded). Feejee group of islands, *Milne*, *Harvey*. Isle of Pines, Aneiteum and Fortuna Islands, *Milne*, *M'Gillivray*. N. Holland, *Brown*. Sydney, *Bynoe* (our specimen very stout and coriaceous, near the base an inch broad); Brisbane River, *A. Cunningham* (sori not so long and narrow). N. coast of Australia, Port Essington, *Armstrong*; Norfolk Island, *All. Cunningham*, *Falconer*, *M'William*, *Dr. Vaughan Thomson* (pinnæ very obscurely lobed), *Milne*, *C. J. Simmons*, *Esq.* N. Zealand, most abundant, from the north as far south as Akaroa and Port Nicholson.—Var. *firmum*, St. Helena, *Beatson*, *Cuming*, n. 429, *J. D. Hooker*, *Seemann*, n. 2637; *Dr. Lyall.*—Few species of *Asplenium* are more generally acknowledged, and few less understood, than *A. falcatum* of Lamarck, and the difficulty has been increased by an opinion which long prevailed, namely, that Forster's N. Zealand *A. polyodon* was different from the Indian *A. falcatum* of Lamarck, whereas the two are identical: both were published in the same year, and one name has as strong a claim to priority as the other. Lamarck's I prefer, for he has given a reference to an excellent though rather rude figure in Burmann, which determines the plant he intended satisfactorily. It is, however, a very variable species, and passes by almost insensible gradations into *A. caudatum* on the one hand, and into *A. macrophyllum* and *contiguum* on the other; and many less generally acknowledged species will perhaps be equally or less deserving of being maintained. The careful Kunze says of *A. falcatum*, "Synonymia hujus speciei et affinium maxime intricata;" and again, "Species difficilis propter pinnarum formam variabilem et a speciebus commixtis adhuc purganda;" and he renders some aid in clearing up these difficulties, but it can only be done satisfactorily by an inspection of authentic specimens. It is hardly possible, here as elsewhere, to define in words the numerous variations which may belong to one and the same species.

133. A. (Euasplenium) *Chamissoanum*, Pr.; "fronds pinnate, pinnæ lanceolate acuminate inciso-serrate, serratures cuspidate cuneate at the base, superior base auricled cuspidato-dentate, inferior base excised, sori oblique, stipes and rachis hairy."—*Kaulf. En. Fil. p.* 175 (sub nom. *A. erosum*, L., *excl. syn. and locality of Fl. Ind. Occ.*). *Pr. Tent. Pterid. p.* 107. *Metten. Asplen. p.* 157. Tarachia, *Pr.*

Hab. Manilla, *Chamisso*.—All that is known, as far as I am aware, of this plant is, that a Manilla Fern, found by Chamisso, was supposed to be identical with the West Indian *Aspl. erosum*, but whether the specific character given by Kaulfuss is intended for the West Indian or for the Manilla plant, as seems most probable, does not appear. Presl, who separates it (I presume on account of its locality), offers no remarks.

134. A. (Euasplenium) *erosum*, L.; caudex short horizontal paleaceous with glossy subulate blackish scales, stipites a span to a foot high lurid-brown, fronds 1–1½ foot long ovato-lanceolate acuminated subcoriaceous pinnated pinnatifid at the apex 2–5 inches long, pinnæ petiolate patent from a broad obliquely cuneate base lanceolate or subovato-lanceolate acuminate subfalcate striated, superior base subtruncate rarely auricled, inferior base excised rarely subequally (not deeply) lobed with the lobes serrated generally very unequally inciso-serrated most deeply so towards the superior base, veins erecto-patent variously forked, sori linear oblique elongated extending almost from the costa to the margin, in the pinnatifid apex they are parallel with the costa, involucre firm-membranaceous. (TAB. CXCVIII.)—*Linn. Sp. Pl. p.* 1539. *Sw. Syn. Fil. p.* 78. *Willd. Sp. Pl.* v. *p.* 327. *Metten. Asplen. p.* 157. *Moore, Ind. Fil. p.* 127. Aspl. falcatum, *Sw. Fl. Ind. Occ.* iii. *p.* 1618 (omitting the Ceylon locality). Tarachia, *Pr.*

Hab. West Indies, *Swartz*; Jamaica, *M'Fadyen*, *March*, n. 330 and 122; *Wilson*, n. 86; Portland Gap, *Purdie* (pinnæ 5–6 inches long, serratures short and rather obtuse); Manchester, *Purdie* (pinnæ ovato-lanceolate, rather deeply but regularly lobato-pinnatifid, the lobes truncate, incised). Cuba, *Linden*, n. 2017 (one specimen with most of the pinnæ trifid, lateral lobes the shortest), *C. Wright*, n. 943.—As *A. falcatum*, Lam., is considered peculiar to tropical countries of the Old World, this may be looked upon as its representative in the New. It has, indeed, been confounded with *A. falcatum* by Swartz, and probably others, and its character as a species mainly rests upon the usually more entire margins of the pinnæ: it is seldom so truly lobato-pinnatifid. At present it is only known in the West Indian Islands.

135. A. (Euasplenium) *paleaceum*, Br.; caudex small compact clothed with densely copious radicles paleaceous above with subsphagneous lanceolate scales with long fringed margins mixed with smaller kinds, stipites tufted scarcely more than an inch high and as well as the rachis shaggy with persistent villose patent scales, fronds firm-subcoriaceous dark villous with soft dark-coloured hairs beneath green paler on the under side 6–10 inches long decumbent flexuose pinnated, pinnæ strongly striated 4–5 lines long subpetiolate patent numerous approximate obliquely rhomboidal ovate sublobate obtuse unequally and rather sharply spinuloso-serrated, superior base truncated and forming a toothed lobe or auricle, terminal pinna subpinnatifid, or more generally the rachis is proliferous, veins flabellate approximate forked (no distinct costa), sori linear chiefly occupying the disk of the pinna in two rows, involucres membranaceous pale opening towards

the centre. (TAB. CXCIX.)—*Br. Prodr. Nov. Holl. p.* 151. *Metten. Asplen. n.* 118 *b.*

Hab. Tropical New Holland, *Brown;* Frankland Isles, N.E. coast of Australia, *M'Gillivray* (*Voyage of the Rattlesnake*).—Few, if any, Ferns perhaps are less known than the present. Save the illustrious discoverer, it appears to have been in the possession of no botanist. I owe my specimens to the naturalist of the surveying voyage of H.M.S. Rattlesnake, who gathered it, apparently very sparingly, on Frankland Isles, a group of the S. Pacific Ocean on the N.E. coast of Australia, lat. 17° 13′ S.; long. 146° 8′ East. It is admirably defined in the short, specific character given by Mr. Brown, and clearly belongs to the present *Furcatum*-section, differing widely from all other known species. The apices of the fronds, without being prolonged, are very apt to bear a scaly bud or gemma, which developes into roots and fronds, and no doubt the plant increases extensively by this means, as well as by spores from the sori.

136. A. (Euasplenium) *planicaule*, Wall.; caudex small thick erect densely rooting crowned with black subulate scales, stipites 3–5 inches long tufted and as well as the rachis compressed sparsely and deciduously villoso-paleaceous, fronds a span rarely to a foot long subcoriaceous firm oblong acuminate (apex pinnatifid) petiolate subhorizontal dimidiato-ovate acuminate venoso-striate from 1 to (rarely) 1½ inch long, superior base obliquely truncate subauriculate, inferior base excised for half or more of the length from the base, the rest of the margin irregularly and often deeply inciso-pinnatifid, segments narrow sometimes pungent, veins erecto-patent conspicuous approximate once or more forked, sori linear-elongated those towards the apex of the pinnæ and those below the costa parallel with the costa, those in the auricle more patent, involucres pale-brown firm. (TAB. CC. *B.*)—*Wall. Cat. n.* 189. *Metten. Asplen. p.* 157. Aspl. falcatum, *c.* abbreviatum, *Kze. in Linnæa*, xxiv. *p.* 260. A. semihastatum, *Wall. MS.* (*not Kze.*). Tarachia truncata, *Br.*

Hab. Nepal, *Wallich.* N. India, *Edgworth.* Srinuggur, *Moorcroft.* Gurwhal, *T. Thomson*, *n.* 1106. Bombay, *Law.* Mahalablahwar, and above Simla, *Col. Bates.* Kumaon, 6400 feet elev., *Thomson.* Khasya, 4–6000 feet elev., *Griffith, Hooker and Thomson, Simons.* Sikkim-Himalaya, *Hooker and Thomson.* Mishmee, *Griffith.* Ceylon, *Mrs. Gen. Walker.* Hongkong, *Col. Dunlop*, *n.* 91; pinnæ broader, very obtuse, rather deeply and obliquely crenated than sharply laciniated, rachis and stipes hispido-paleaceous.—The present species of the *Furcatum*-group of *Asplenium* is never more than once pinnated, however deeply pinnatifid or laciniated the pinnæ may be: nor do any of my numerous specimens exhibit any forms which can be considered as a passage to *Aspl. falcatum*. Its nearest affinity is perhaps with some of the less compound forms of *A. laciniatum*, but the evenness of the surface (beneath especially), and the short sori, will afford good distinctions. My Hongkong specimens are more likely, on further investigation, to prove different: the pinnæ have more the form of those of *Aspl. erectum*, but the texture is firmer and more venoso-striate, and the stipes and rachis are patently villoso-paleaceous. The compressed stem, which doubtless

induced Dr. Wallich to give it the name we have adopted, though evident enough in general, is not always so.*

(Furcatum-*group, continued.*)

Bi-tripinnate.

137. A. (Euasplenium) *laciniatum*, Don; caudex thick short ascending densely clothed with blackish falcate imbricated subulate rigid scales, stipites cæspitose 4–6 inches brown and as well as the stramineous rachis partially and deciduously scaly compressed, fronds erect a span to a foot long oblong-acuminate subcoriaceous tawny-brown when dry very opaque pinnate the apex narrow pinnatifid, pinnæ distinctly petiolate 20–50 horizontal ½ an inch to 1 inch long semiovate or semiovato-lanceolate subfalcate auricled at the superior base excised at the inferior for more than half the length of the pinna lobed and inciso-serrate or again pinnate especially in the lower half the rest laciniato-pinnatifid, pin-

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* The following list of supposed species of *Asplenium* (§ Euasplenium) having pinnated fronds, are wholly unknown to me, and either undescribed or so imperfectly described that it is only in two or three instances they can be referred, and then very doubtfully, to any in this work. It may suffice to give them in this note.

Aspl. Martensii, *Fée*, 9me *Mém. p.* 13; *Metten. Asplen. p.* 100 (*not* Kze.). Mirador, *Galeotti.* A. repandulum, *Mart. et Gal. Fil. Mex. p.* 56 (*not* Kze.).—Undescribed. Moore refers it to *A. salicifolium.*

A. cultrifolium, *var.?* diodon, *Kze. in Linnæa*, xxiii. *p.* 303. Caracas.—This var., referred doubtfully by Kunze to *A. cultrifolium*, Willd., is suspected by Mettenius, who has seen a fragment, to be a var. of *A. obscisum* (*A. firmum* of this work).

A. recurvatum, *Don*, *Prodr. Nep. p.* 7. Nepal; "frond linear-lanceolate pinnate elongated recurved and radicant at the apex, pinnæ trapezoid alternate shortly petiolate striated hairy the superior cleft (*diffissis*), bearing sori, stipes and rachis terete hairy." *Metten. Asplen. p.* 122. *Moore, Ind. Fil. p.* 160.

A. lanceolatum, *Forsk. Fl. Æg. Arab. p.* 185. Arabia, *Sw. Syn. Fil. p.* 86. *Metten. Asplen. p.* 122.—Moore refers it doubtfully to *A. erectum.*

A. polyphyllum, *Bert. Act. Bonon.* iv. *p.* 443 (*not* Mart. et Gal.). Guatemala, *Metten. Aspl. p.* 122. A. polymera, *Moore, Ind. Fil. p.* 154.

A. diodon, *Fée, Gen. Fil.*; "fronds pinnate lanceolate glabrous, rachis winged above, pinnæ oval cuneate auricled above emarginate at the base obtuse deeply dentato-crenate, teeth often bidentate, sori ovoideo-oblong approximate in maturity, indusium whitish narrow, sporangia ovate, annulus 18–20-articulate, spores short obliquely ovoid. Philippines, *Cuming.*" Habit of *Aspl. regulare*, Sw. (A. erectum). *Metten. Asplen. p.* 122. *Moore, Ind. p.* 125.

A. pyramidatum, *Desv. Mém. Linn. Soc.* vi. *p.* 271. Tristan d'Acunha. *Metten. Aspl. p.* 122. *Moore, Ind. p.* 159.

A. Miradorense, *Liebm. Fil. Mex. p.* 91. Mexico. *Metten. Asplen. p.* 122. *Moore, Ind. Fil. p.* 146.—May it not be *A. erectum?*

A. setosum, *Desv. Berl. Mag.* v. *p.* 322 (*not* Pr.). Madagascar. *Metten. Aspl. p.* 136. *Moore, Ind. Fil. p.* 168.—Said to be allied to *A. ebeneum*, but with the rachis setose.

nules cuneate bi-trifid, superior basal one (corresponding to the auricle in the more entire pinnæ) large broad flabelliform cristato-laciniate, veins distant forked, sori oblong 3–4 radiating in the auricle (or ultimate pinnule) towards the apex arranged nearly parallel with the costa. (TAB. CC. *A.*)—Var. *bipinnatum*, pinnæ again pinnated in the lower half, pinnules flabellato-cuneate laciniated. Aspl. laciniatum, *Don, Prodr. Nep. p.* 8. *Moore, Ind. Fil. p.* 139. Aspl. cæspitosum, *Wall. Cat. n.* 217. *Metten. Asplen. p.* 129. Aspl. falcatum, *b.* laceratum, *Kze. in Linnæa*, xxiv. *p.* 260 (*Moore*).—Var. *subintegrifolium*, pinnæ lobed or laciniated.—"Var. *depauperatum, Moore.* Aspl. depauperatum, *Wall. Cat. p.* 234." (*Moore.*)

Hab. India. Var. *subintegrifolium*. Sikkim Himalaya, Katong River, *J. D. Hooker and Thomson.* Dupla Hills, Bhotan, *Booth*, passing into var. *laciniatum*. —Var. *laciniatum*. Nepal and Sylhet, *Wallich;* Assam and Khasya, *Griffith, Simons, Hooker and Thomson.*—I follow Moore in referring the *A. depauperatum* of Wallich, of which I have no authentic Wallichian specimen, to *A. laciniatum*, Don. The species is very peculiar and very distinct, varying with simply pinnate and bipinnate fronds, and still more in the shape of the pinnæ and pinnules.

138. (A. Euasplenium) *furcatum*, Thunb.; caudex oblique scarcely repent stout clothed above with copious very slender glossy brown silky hair-like ciliated scales, stipites copious tufted 4 inches to a span long more or less clothed as is the rachis with ferruginous ciliated hair-like scales, fronds a span to a foot and more long ovato-lanceolate acuminate coriaceous rigid mostly bi- rarely tri-pinnate dark-green and glabrous above pale and often villous beneath, pinnæ and pinnules more or less patent, primary ones petiolate secondary ones more or less decurrent generally narrow-cuneate or subspathulate or rhomboidal truncated or rounded or acuminated, at the apex bi-trifid or bi-tripartite the apices dentate or variously and often very irregularly incised, veins conspicuous compact once or more forked erect (giving a striated appearance to the pinnæ) linear-elongate parallel with the central vein (there is no distinct costa) chiefly on the lower half of the pinnule, involucre membranaceous very narrow.—*Thunb. Prodr. Fl. Cap. p.* 172. *Sw. Syn. Fil. p.* 83. *Willd. Sp. Pl.* v. *p.* 340. *Schk. Fil. p.* 73. *t.* 79 (pinnules broad and rhomboidal, approaching to *A. cuneatum*). Aspl. fragrans, *Schk. Fil. p.* 199. *t.* 130 *b.* (*not Sw.*), (apex of a frond only, of the more common form). A. falsum, *Retz, Obs.* vi. *p.* 38. A. adiantoides, *Lam.* (*non alior.*). A. præmorsum, *Sw. Fl. Ind. Occ.*

iii. *p.* 1620. *Syn. Fil. p.* 83. *Brown, Prodr. p.* 150. *Moore, Ind. Fil. p.* 155. A. Canariense, *Willd. Sp. Pl.* v. *p.* 339. *Webb, Plant. Canar.* 440. *t.* 251 (less compound form, as are all the specimens from the W. African islands). A. geminaria, *Bory*. A. strictum, *Bory* (*Schlecht.*). A. Mascariense, *Desv.* A. nigricans, *Kze.* A. tripartitum, *Bl.*, and A. falcatum, var. abbreviatum (*fide Mett.*). A. cuneatum, *Hook. et Grev. t.* 189 (small specimen). A. laceratum, *Desv. Mém. Linn. Soc.* vi. *p.* 278 (*fide Moore*). A. hirsutum, *Heyne, in Wall. Cat. n.* 212. A. Mysurense, *Roth, in Wall. Cat. n.* 213. A. cicutarium, *Roxb. Crypt. Pl. p.* 38 (*fide Moore*). Tarachia Browniana, *Pr. Epimel. Bot. p.* 260 (pinnules broad-cuneate more membranaceous).

Hab. Tropical and subtropical regions, probably throughout the world. S. Africa, *Thunberg* and all succeeding travellers; as far east as Macalisberg, *Sanderson*. Madagascar, *Lyall, Bojer*. St. Helena, *J. D. Hooker, Lefroy*; Bourbon (*from Herb. Mus. Par.*). Australia, probably rare; N. S. Wales and S. coast of N. Holland, *Brown*; E. trop. coast, *All. Cunningham*, Swan River, *Drummond*. West African Islands: St. Vincent's, *Vogel, Miller, Forbes*; Canary Islands and Madeira, frequent. Abyssinia, *Schimper*, n. 263, 678, and 718 (all these have the pinnæ deeply pinnatifid, rarely again pinnate). East Indies; Ceylon, on mountains, 7–8000 feet elev., *Thwaites*, and *Gardner*, 1341; and Madras Penins., *Wight* (pinnules broad, resembling *A. cuneatum*). Nielgherries, *Sir F. Adams, Hohenacker*, n. 910; *Gardner, Schmidt*, n. 46; *G. Thomson* (one specimen with the pinnules peculiarly narrow and slender); Mergui, *Griffith* (segments and pinnules very slender; other specimens with fronds 1½ foot long, very stout and coriaceous, exactly resembling the figure of *A. insititium*, Brack.); Assam, *Griffith* (with broader and more membranaceous pinnules*); Java, *Blume*, two scarcely different states, one marked var. *fragrans*, the other var. *vestitum*. Island of Tsus-Sima, Strait of Corea, *Wilford* (vars. with broad and very narrow pinnules). Tropical America (a large proportion of these have the more simple form of pinnæ that we find in the specimens from the W. African Islands, and none

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* Several specimens, from India, very compound, having this form, are in my herbarium, marked *A. præmorsum*, *β latum*, by Mr. Moore, and by which name they will be quoted, probably, in the Ind. Fil., but they are generally accompanied by specimens of the ordinary forms, and even attached to the same caudex. They almost indicate a passage to *A. cuneatum*. On the other hand, I possess, from Ceylon, sent by *Gardner* (n. 1339), two specimens, and evidently considered by him to be the same, and which I believe to be so, if not derived from the same caudex,—one having the pinnæ as entire as the most entire of *Aspl. caudatum*, and it might well pass for the same, the other with pinnæ broken up, if I may so say, into cuneate pinnules into that state of *furcatum* (præmorsum, *Moore*,) which Moore calls "*β latum*." Since the above was in type, I have been favoured with the yet unpublished sheet of Mr. Moore's Ind. Fil., which includes our *A. præmorsum*, Sw. (furcatum *β*, *Moore*). The list of synonyms is very copious. Amongst the published names are *A. furcatum*, Wall. Cat. 2206, and Schlecht.; *A. nigricans*, Kze.; *A. Maderense*, Penny, and Kze.; *A. obtusilobum*, Desv.; *A. dentex*, Sol., Kze.; *A. filare*, Förak.; *A. adiantoides*, Lam.; *A. falcum*, Retz.; *A. furcatum*, Schk. Fil. 73. t. 79; *A. Mascariense*, Desv., etc.

seem to pass into the very compound and *cuneatum*-forms observable in the East Indian specimens). Caracas, Venezuela, *Schlim*, n. 638 and 846; *Birschel*, *Triana*, n. 242; *Fendler* (n. 156, pinnæ deeply pinnatifid submembranaceous), n. 157. Bogotá, *Holton*, n. 67. Peru, *Pœppig*, *M'Lean*, *Mathews*, n. 983; *Lechler*, n. 2013. Ecuador, walls of Quito, *Jameson*. Brazil, *Gardner*, n. 181 and 5314. Isle of Gorgona, Guatemala, *Skinner*. Mexico, *Jurgenson*, n. 627; *Galeotti*, n. 6390 (on Liquidambar trees of Xalapa); *Hartweg*, n. 417. West Indies, Jamaica, *Swartz;* on Catherine Peak, elev. 5000 feet, *Wilson*, *Purdie*, *M'Fadyen*. Galapagos, *Capt. Wood*. Sandwich Isles, *Menzies*, *Brackenridge*, on the Kaala Mountains, Oahu, pinnæ with ordinary acuminated form. St. Paul's Rock, S. Indian Ocean, lat. 38°–39°, growing among stones at the edge of the crater (now a lake), *M'Gillivray and Milne* (Voyage of the 'Herald').

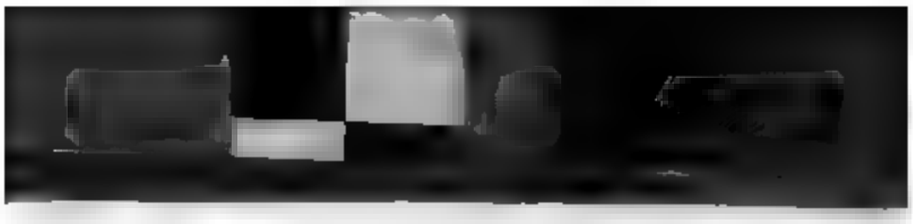
Varying as this extensively-diffused species assuredly is in its composition, more or less divided, and in the apices of the pinnæ and pinnules more or less truncated or acuminated, yet it is in most cases easily recognized. In India, however, there are forms which it is difficult to distinguish from *A. cuneatum*, although in the normal state of these plants no two *Asplenia* can well be more distinct, and I feel even now unwilling to bring them into the same section.

There is again another puzzling plant, the *Aspl. spathulinum*, of J. Sm. (*A. insititium*, Brack.), which has the subcoriaceous and firm texture of *A. furcatum*, and the broad-cuneate pinnules of *cuneatum*. This I have thought better to retain as a species, near *A. cuneatum*. Mettenius refers the *A. spathulinum*, J. Sm., from Luzon, to *A. nitidum*, Sw., while Moore retains the *A. insititium* from the Sandwich Islands, which is nevertheless identical with the Luzon plant.

139. A. (Euasplenium) *solidum*, Kze.; caudex subrepent rather stout, stipites aggregated 4–6 inches high dark-brown or castaneous, fronds oblong-lanceolate acuminate very rigid thick and firm glossy glabrous bipinnate a span to a foot high pale-coloured beneath, pinnæ petiolate 3–4 inches long, pinnules shortly petiolate ovate or suboblong in outline distant deeply pinnatifid and sometimes bipinnatifid (in the larger specimens) ultimate ones decurrent and confluent, segments narrow-cuneate all of them pungently incised, veins few subflabellate, sori few rarely more than one or two on each segment subdareoid often extending to the decurrent wing of the rachis where the involucre opens towards the rachis, involucre membranaceous brown, capsules copious prominent (pulvinate). (Tab. CCI.)—*Kze. in Linnæa*, x. *p.* 520. *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 21. *Metten. Asplen. p.* 143.

Hab. South Africa, Cape territory, Algoa Bay, mountains near Ringter Valley and near Alice, *Forbes*, *Drége*, *Mr. Stewart*.—A distinct and peculiar species, evidently bordering on *A. furcatum*, but abundantly different in character.

140. A. (Euasplenium) *Montbrisonis*, Fée; "fronds bipinnate ovate abruptly contracted towards the apex, stipes glabrous blackish, rachis squamulose, pinnæ flabellate bipinnate acuminato-dentate segments irregularly toothed, inferior ones



ovate cuneate, rhizome thick scaly bearing scattered fronds, scales lanceolate long-acuminate entire minutely reticulated (*rete tenuissimo*), sori approximate indusium large, capsules ovate, annulus of from 18–20 joints, pedicel short, spores ovoid."—*Fée, Gen. Fil. p.* 198. *t.* 5 *A. f.* 3 (two pinnules). *Metten. Asplen. p.* 159.

Hab. Bourbon, *De Montbrison.* "A Fern bordering upon *A. nigrescens*, Kze." —*A. nigrescens*, Kze., is certainly related to *A. furcatum*, Thb., and, indeed, is considered by Mettenius a synonym to that species. It may be presumed that the place of the present is near to that polymorphous plant.

141. A. (Euasplenium) *denticulatum*, Bl.; "frond bipinnatifid coriaceous, pinnæ petiolate small ovate deeply tripartite or pinnatifid, segments cuneato-oblong obtuse obsoletely denticulate at the apex paleaceo-hirsute at the costa beneath."—*Bl. En. Fil. Jav. p.* 186. *Metten. Asplen. p.* 159.

Hab. Mount Gede, Java, *Blume*, who compares it with his *Aspl. tripartitum*, which Mettenius refers to *Aspl. furcatum*.

Next to this, and probably of this section, Mettenius places *Aspl. blepharophoron*, Bertol. Act. Bonon. iv. p. 443, of Guatemala, which is quite unknown to me.

142. A. (Euasplenium) *splendens*, Kze.; "frond ovate acuminate bipinnate, pinnæ lanceolato-acuminate alternate remote petiolate patulous, lower pinnules petiolate rhombeo-ovate their base cuneate rounded at the apex crenulato-dentate sublobate superior ones elongate incised, all sessile veined above shining and glabrous, beneath sparingly nigro-paleaceous, sori irregular, stipes at the base and rachis paleaceous."—*Kze. in Linnæa*, x. *p.* 516. *Metten. Asplen. p.* 158. *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 21.—"Var. *β elongatum*; pinnules all elongate inciso-dentate."—*Kze. l. c. Metten. l. c.*

Hab. S. Africa; Philipstown and Katriver, in woody mountains, *Ecklon.* Omsamubo and Omsamcaba, *Drège.* Natal, *Plant.*—"Differs from *Aspl. cuneatum*, Lam., in the ovate outline of the frond, in the broader, shining pinnæ, in the stipes and rachis beneath being paleaceous, in the sori occupying the base of the pinnules." I possess no authentic specimen of this save the *var. β*, and I do not see how that differs from a common form of *A. cuneatum*. Kunze's next species, l. c., is his *A. cuneatum*, of the Cape, which is both by Mettenius and Moore referred to *Aspl. pulchrum*, P.-Thouars, but by me to a compound state of *Aspl. erectum* (see p. 127).

143. A. (Euasplenium) *cuneatum*, Lam.; caudex rather stout repent clothed at the apex with pale-brown subulate sericeous scales, stipites aggregated from a span to a foot long lurid-brown usually quite free from scales, fronds 1–1½ foot long ovato-lanceolate membranaceous opaque dull-green

bi-tripinnate, at the apex pinnated, pinnæ sparse distant petiolate patent from a broad base lanceolate acuminate a few of the ultimate pinnules confluent into a small lanceolate lobato-pinnatifid apex, the rest either oblique spathulato-cuneate subpetiolate undivided toothed at the rounded apex or 3–4-lobed or sometimes the lowest ones again pinnated with few pinnules, ultimate pinnules cuneate and tapering below into a slender petiole the obtuse or subtruncated apex toothed or serrated, veins erecto-parallel subflabellate once or twice forked (no distinct costa), sori generally 5–7 linear, involucre membranous brown.—*Lam. Encycl.* ii. *p.* 309. *Sw. Syn. Fil. p.* 84. *Willd. Sp. Pl.* v. *p.* 344. *Schk. Fil. p.* 73. *t.* 78 (*good*). *Kze. in Linnæa*, ix. *p.* 69. *Metten. Asplen. p.* 117 (*excl. syn.* A. affine, *Sw. and Sieb. Syn. Fil.*). *Moore, Ind. Fil. p.* 71. A. crenatum, *Desv.* A. gracile, *Fée, 7me Mém. Foug. p.* 52. *t.* 27. 1? Tarachia cuneata, *Pr. Epimel. Bot.* A. nitidum, *Bl. in Herb. Nostr.* A. cristatum, *Brack. Fil. U. St. Expl. Exp. p.* 163. *t.* 21. *f.* 3 (*not Wall.*).

Hab. West Indies, Jamaica, *M'Fadyen, etc.* St. Vincent, *L. Guilding.* Cuba, *Poeppig.* Trop. S. America, British Guiana, *Schomburgk, n.* 340, *C. S. Parker.* Brazil, *Brackenridge;* Pará, *Spruce, n.* 8. S. Africa: Grahamstown, Natal, Caffraria, *Ecklon and Zeyher, Atherstone, Plant, Espinasse;* Macalisberg, *Sanderson* (all my S. African specimens have much larger pinnules, of a more rhomboidal form, more resembling those of *A. nitidum*, but not glossy). Mozambique, *Forbes* (exactly resembling the W. Indian form). Java, *Blume*, ordinary form; one marked *A. nitidum*, Bl., exactly the *A. cristatum*, Brack., with small pinnules. Luzon, *Cuming, n.* 54 (one specimen of a firmer texture and almost intermediate between *A. affine* and *A. spathulinum*, but pinnules smaller). Feejee group of islands, *Milne, n.* 135, 206, and 296 (specimens variable, some of the ordinary form, others quite like the S. African). Sandwich Islands, *Dr. Diell*—A. Diellii, *A. Gray, MS.*—(small, approaching *A. cristatum*, Brack.): this Mr. Moore refers to *A. patens*, Klfs. Hongkong, *Bowring, Alexander, C. Wright* (*Herb. of U. S. N. Pacif. Expl. Exped.* 1853–56, sub nom. *A. laserpitiifolium*, Lam.): two specimens, one of the more ordinary form, the other resembling the Luzon specimen above noticed of Cuming.

I have already intimated the close affinity of this with the stouter and more rigid and different-looking *A. spathulinum* and *A. affine*, Sw. It will be as difficult to form a clear line of distinction between this and *A. nitidum*, *A. laserpitiifolium*, Lam., and *A. patens*, Kaulf., if, indeed, they be really distinct from each other.

144. A. (Euasplenium) *affine*, Sw.; caudex rather stout subrepent clothed above with copious almost black subulate scales, stipites aggregated dark brown 4–10 inches high partially and deciduously setoso-paleaceous, fronds 1–1½ foot high or more, ovato-lanceolate acuminate subcoriaceous dark brown (when dry) opaque bipinnate pinnate only at the apex, pinnæ petiolate rather distant 3–4 or 6 inches long, pinnules ½ an inch to 1 inch long petiolate obliquely rhombeo-

ovate obtuse or subacuminate sublobate unequally serrated in their superior half, terminal ones small and confluent into a pinnatifid apex, inferior pinnules with a large cuneate auricle at the superior base sometimes free, and sometimes though rarely the pinnules are again pinnated, veins erect parallel subflabellate (giving a striated appearance) no distinct costa, sori copious linear but varying in length, involucres firm-membranaceous. (TAB. CCII.)—*Sw. in Schrad. Journ.* 1800. ii. *p.* 56. *Syn. Fil. p.* 84. 279. *Willd. Sp. Pl.* v. *p.* 343. *Moore, Ind. Fil. p.* 111 (*not of Kunze, Bot. Zeit.* vi. *p.* 175. *under n.* 347 *z*). Aspl. cuneatum, *Metten. p.* 117.—Moore, in his Index, adds as synonyms *Aspl. nitidum*, Sw.?, in part, from Mauritius, of which I appear to have no specimen, and *Cœnopteris cuneata*, and *Darea cuneata*, and *Darea obtusa*, all of Desvaux, which I have no opportunity of verifying.

Hab. Mauritius, *Sieber* (Syn. Fil. n. 71), and *all collectors* there.* Bourbon, *Carmichael* (pinnules more acuminated) —Extremely common, if I may judge from the numerous specimens I have received thence, and almost invariably under the name of *Aspl. cuneatum*, though it is sensibly different from the West Indian state of Lamarck, the original authority. Capt. Carmichael alone (Herb. Nostr.), had attached the name of *A. affine* to that Mauritian plant. Willdenow seems only to have known *A. affine* from Swartz's description. Presl and Fée appear to ignore the name altogether. Kunze has, I think, fallen into an error, in Bot. Zeitung, l. c., in considering the S. American and W. Indian and his own *A. cuneatum* of Pœppig, from Peru, the *A. affine* of Sw. and Sieber's Syn. Fil. n. 71. This circumstance again appears to have induced Metteniua to unite *A. affine* with *A. cuneatum, verum*. Moore adopts, I think judiciously, the *A. affine*, Sw. (including Sieber's n. 71), and restores the plant of Pœppig, from Cuba, and the W. Indian specimen, to their place as the original *cuneatum* of Lamarck. *A. affine* is unquestionably much more nearly allied to *A. spathulinum*, J. Sm., than to the ordinary forms of *A. cuneatum*, in colour, size, and texture; and it would be difficult to detect a valid distinction, save in the almost universally spathulate or cuneate form of the pinnules of *A. spathulinum*, as compared with the rhomboideo-ovate and more unequally-sided segments of the pinnules of *A. affine*. These differences will be best seen in our figures.

145. A. (Euasplenium) *spathulinum*, J. Sm.; stipites 6 inches and more high quite smooth and naked lurid-brown, fronds 1–1½ long broad- or ovato-lanceolate acuminate coriaceous dark brown when dry and very opaque quite free from scales bipinnate in the perfect state pinnate at the very apex sometimes pinnate with pinnæ from an unequally cuneate and auricled base entire and others deeply pinnatifid at their base or subpinnate, pinnæ lanceolate broad at their base, pin-

* Moore gives for localities of *A. affine*, Sw., besides the "Mascaren Islands" (Mauritius and Bourbon), "India, Ceylon, *Thwaites*, n. 1800, *Gardner*, n. 1084, Java, Borneo, and Island of Johna."

nules or lobes obovate the former tapering at the more or less oblique cuneate base so as to be spathulate always more or less serrated towards the apex, ultimate ones more or less confluent into an acuminated serrated apex, intermediate ones frequently decurrent so as to form a winged rachis, veins erecto-patent flabellate conspicuous and with the long linear sori giving a striated appearance to the pinnules, involucres firm-membranaceous narrow.—*J. Sm. in Hook. Journ. of Bot.* iii. *p.* 408 (*name only*). *Moore, Ind. Fil. p.* 139. A. nitidum, *Metten. Asplen. p.* 162. Aspl. insititium, *Brack. Fil. U. S. Expl. Exp.* 161. *t.* 22. *f.* 2. *Metten. Asplen. p.* 159.

Hab. East Indies and Pacific Islands. Luzon, *Cuming*, n. 210. Borneo, *Wallace, Thos. Lobb*, at the Lobong River. Sandwich Islands, *Douglas*, n. 44 and 45; *Brackenridge*, in forests; and island of Aneiteum. Ceylon, *Mrs. Genl. Walker, Gideon Thomson*, on Newera Ellia (Distrib. of Herb. Ind. Or. of Hook. fil. et Thomson, n. 176).—This plant has been first described and well figured by Brackenridge, from the Sandwich Islands, but it has been long in my herbarium from the same islands gathered by Douglas, and from other localities by other collectors, and placed doubtfully with *Aspl. cuneatum*, from which, however, I am disposed to consider it truly distinct, but, like so many other Ferns, it is liable to considerable variations, as will be easily seen if one has tolerably numerous suites of specimens. The figure in question represents neither of the extremes of these varieties. Some of our specimens from Douglas have the superior pinnæ as entire as in the ordinary state of *Aspl. hirtum*, Kaulf.; the lower ones deeply lobed with obovate lobes, but the sinuses not extending to the rachises,—not pinnated. Cuming's plant has the superior pinnæ entire, the inferior ones pinnate, the rest of our specimens are almost entirely bipinnate with obovato-spathulate pinnules. In one specimen from Borneo the pinnules are deeply lobed, and even pinnatifid.

146. A. (Euasplenium) *gracile*, Fée; "fronds pinnate glabrous shortly stipitate, rhizome slender creeping, pinnæ auricled above cuneate dentato-incised at the margin the teeth obtuse, rachis compressed, sori elongated few linear, capsules shortly pedicellate, annulus 14–16-articulate, spores ovoid."—*Fée, Gen. Fil. pp.* 191 *and* 198. *7me Mém. Foug. t.* 27. *f.* 1. *Metten. Aspl. p.* 117. *Moore, Ind. Fil. p.* 135.

Hab. Philippine Islands, without No., *Cuming*. — About four inches high. "Peut-être est-ce là quelque petite forme d'une espèce ordinairement plus grande?" It has quite the appearance of a very young plant of *Aspl. cuneatum*, "n'offrant aucune particularité."

147. A. (Euasplenium) *laserpitiifolium*, Lam.; caudex rather stout subrepent clothed at the extremity with copious satiny ferruginous subulate scales, stipites aggregate 3–4 inches to a foot long lurid-brown, fronds a span to 2–3 feet long ovato-lanceolate finely acuminated membranaceous often delicate green 3–4-pinnate the surface opaque, primary pinnæ

3 inches to a span long petiolate, from a broad base broad-lanceolate finely acuminate into an incised cauda, secondary pinnæ 1–3 inches long, ultimate pinnules and segments small for the size of the fronds 3–5 lines long cuneate undivided or deeply pinnatifid or 3-lobed, the lobes or segments generally narrow-cuneate sometimes broad incised or toothed at the apex, veins flabelliform nearly erect parallel, sori linear rather short 2–4 on a pinnule or segment, often exactly opposite to each other and opening face to face, involucres membranaceous. (TAB. CCIII.)—*Lam. Encycl. p.* 310. *Sw. Syn. Fil. p.* 65. *Willd. Sp. Pl.* v. *p.* 347. *Bl. Enum. Fil. Jav. p.* 188. *Brack. Fil. U. S. Expl. Exp. p.* 166. *Metten. Asplen. p.* 160. *Moore, Ind. Fil. p.* 140. Aspl. riparium, *Brack. Fil. U. S. Expl. Exp. p.* 162 (*not Liebm.*). A. robustum, *Bl. En. Fil. Jav. p.* 189 (*in Herb. Hook.*). A. tripinnatum, *Roxb. Crypt. p.* 300 (*fide Moore*). Tarachia, *Pr.* A. patens, *Klfs. Enum. Fil. p.* 175. *Hook. et Arn. Bot. of Beech. Voy. p.* 274 (*not* 106). *Metten. Asplen. p.* 159. *Moore, Ind. Fil. p.* 152. Diplazium, *Presl, Fée.*

Hab. Praslin Isle, Seychelles, *Lamarck*. Malay Islands, probably generally. Java, *Blume, De Vriese, Thos. Lobb*. Luzon, *Cuming*, n. 43 (smaller but less compound specimens, scarcely distinguishable from *A. cuneatum*), *Lobb*, n. 451. Bonin Isles, *Beechey, C. Wright*. China, *Alexander*, n. 324. Hongkong, *Wilford*, n. 16 (stipes and rachis almost black). Feejee group of islands, abundant, and Isle of Pines, and Solomon's Group, *Milne*. Fitzroy Island, N. E. Australia, *M'Gillivray*. Mexico, *Liebmann*. Portorico, *Schwanecke* (in Herb. Nostr., quite like the Indian specimens).—Too near, I fear, to *Aspl. cuneatum*, of which it appears to me to be a more compound and luxuriant variety. If this form were peculiar to the East Indies, as it was long supposed to be, that might have favoured the view of the species being distinct, but now Mexico is found to produce the same form, according to Liebmann, and my Portorico specimen differs in no respect from true *laserpitiifolium*.

148. A. (Euasplenium) *nitidum*, Sw.; "2–3 feet high, stipes a foot and more high terete glabrous blackish-brown, frond deltoid a foot broad bipinnate, rachis terete furrowed, pinnæ alternate horizontally patent, pinnules distinct petiolate rhombeo-ovate angled at the base above and below rounded at the apex serrato-dentate above lineato-striate beneath radiato-venose, lowest pinnules pinnatifid at the base or furnished with a cuneato-obovate auricle superior ones gibbous above, all quite glabrous glossy above paler beneath, sori contiguous straight or oblique near the costa not extending to the margin, involucres whitish membranaceous." *Sw. Syn. Fil. pp.* 84 *and* 280.—*Schk. Fil. p.* 76. *t.* 81. *Willd. Sp. Pl.* v. *p.* 344. *Bl. En. Fil. Jav. p.* 188 (*not Bl. in Herb. Hook., which*

is a form of A. cuneatum). *Metten. Asplen. p.* 160. *t.* 5. *f.* 31 (*excl. syn.* A. spathulinum, *J. Sm.*). A. insigne, *Bl. En. Fil. Jav. p.* 188 (*pinnules acuminated*). A. pulchellum, *Wall. Cat. n.* 214. A. trigonopterum ? *Kze. Bot. Zeit.* vi. *p.* 524. *Metten. Asplen. p.* 107. *t.* 5. *f.* 25 (*pinnule only*). *Moore, Ind. Fil. p.* 175 ? (*sori unknown*).

Hab. East Indies, Tranquebar, *Röttler*. Assam, *Simons*, *Griffith* (pinnules scarcely glossy, much acuminated, deeply laciniated). Sikkim, *Hooker fil. and Thomson* (pinnules smaller, opaque). Moulmeine, *Parish* (one specimen with the narrow pinnules of Wallich's Sincapore plant). Malacca, *Griffith*, *Cuming*, n. 376. Java, *Blume*. Labuan, *Thos. Lobb*. Sincapore, *Wallich* (pinnules and segments much narrower), *Thos. Lobb*, n. 26. Ceylon, *Mrs. Gen. Walker*.—I prefer giving the character of this variable species from the author. The pinnules not only vary considerably in different specimens, but on the same individual, so that, different as are the figures of Schkuhr and Mettenius, both are correct. I have referred to it, from my own herbarium, such specimens as I believe to belong to it. Cuming's specimens, n. 376, may be considered typical of the species. What is *Aspl. polystichoides*, Bl., Herb. Lugd., from Borneo? of which I find no description.

149. A. (Euasplenium) *stereophyllum*, Kze.; "frond coriaceous rigid sparingly pilose linear or linear-lanceolate acuminate bipinnate, pinnæ shortly petiolate divergent or patenti-divergent trapezio-ovato-oblong obtuse subauriculate, pinnules remote cuneato- or spathulato-sublinear incised or dentate at the apex, superior base larger wider more deeply incised, all decurrent at the base, stipes short fusco-paleaceous at the base and as well as the rachis subflexuose pilose terete obsoletely margined rigid fusco-purpurascent opaque." *Kze. in Bot. Zeit.* vi. *p.* 175.—*Metten. Asplen. p.* 158.

Hab. Java, "*Zollinger*, n. 2236, and n. 2249."—"Allied to *A. fragrans*, Sw., but distinct in the outline of the frond, in the form of the pinnules and rigid habit. Blackish when dry. Frond 6–10 lines long, 2 inches wide at the base. Stipes 3½–5½ inches long."—Mettenius, who describes this species apparently from authentic specimens, places it near the S. African *A. splendens*, Kunze, but does not allude to its affinities.

150. A. (Euasplenium) *dareoides*, Bory; "fronds pyramidal bi-tripinnate, pinnæ alternate very acute, pinnules wedge-shaped below, above subtruncato-crenate." *Bory in Belanger, Bot. p.* 50 (*not Desv.*).—*Metten. Asplen. p.* 158. *Moore, Ind. Fil. p.* 123.

Hab. Java. "Cette espèce croît à la manière de l'*Aspl. Ad.-nigrum* de nos climats, mais est en tout plus grêle." Its real affinity is very doubtful. Mettenius places it near *A. dareæfolium*, in a section with fronds bi-quadripinnate.

151. A. (Euasplenium) *dareæfolium*, Bory; "fronds pinnate, pinnæ lanceolate acuminate deeply pinnatifid, segments lanceolato-cuneate unequally toothed at the apex, superior

sori parallel with the costa, rachis hairy." *Bory in Willd. Sp. Pl.* v. *p.* 335.—*Metten. Asplen. p.* 158. *Moore, Ind. Fil. p.* 123. Aspl. cænopteroides, *Desv. Prodr. p.* 276.

Hab. Bourbon, *Bory.*—This is placed next to *Aspl. caudatum* by Willdenow, but he makes no allusion to its affinities. Mettenius places it between *A. stereophyllum*, Kze., and *A. splendens*, Kze.

(Compositæ variæ.—*For the most part bi-tripinnate or decompound, without the character of the previous or of the following groups. A very heterogeneous set, it must be confessed.*)

152. A. (Euasplenium) *pumilum*, Sw.; caudex small erect scarcely any unless the tufted fibrous roots can be so called, stipites cæspitose 1–6 inches long slender green castaneous at the base, fronds 2–4 or 5 inches long membranaceous deltoid acuminate, pinnæ few 5–9 or 11 superior ones confluent intermediate ones sessile and as are the superior lobes ovato-lanceolate obtuse or acuminate cuneate at the base lobato-pinnatifid the lobes unequally serrated, lowest pair often again pinnate, veins pinnated often hairy beneath several times forked, sori very irregular oblong or linear-elongate, involucres very thin membranaceous generally ciliated at the margin.—*Sw. Fl. Ind. Occ.* iii. *p.* 1610. *Syn. Fil. p.* 76. *Willd. Sp. Pl.* v. *p.* 308. *Metten. Fil. Hort. Lips. p.* 75; *Aspl. p.* 127. *Moore, Ind. Fil. p.* 158. Aspl. anthriscifolium, *Jacq. Coll.* ii. *p.* 103. *t.* 2. *f.* 3, 4. A. humile, *Spr. Neue Ent.* iii. *p.* 6. A. pumilum, *var.* hymenophylloides, *Fée, 7me Mém. p.* 54. *t.* 15. *f.* 4. "A. Schimperianum, *Hochst. Pl. Schimp.*" (*Metten.*). A. tenerrimum, *Hochst. Pl. Schimp.* n. 2064. A. minimum, *Mart. et Gal. Fil. Mex. p.* 55. *t.* 15. *f.* 1. A. heterophyllum, *Pr. Rel. Hænk.* i. *p.* 40 (*fide Moore*). *Plum. Fil. t.* 66 *A.*

Hab. W. Indies, *Swartz*; Jamaica, *M'Fadyen, Purdie.* Martinique, *Belanger*; Cuba, *Poppig, C. Wright*, n. 301; Martinique, *Sieb.* n. 361; St. Vincent, *L. Guilding*; Guadeloupe, *L. Herminier* (large, pinnæ much acuminated). Caracas, *Moritz*, n. 19. Venezuela, *Fendler*, n. 130. Mexico: Orizaba, *F. Mueller*, n. 2331 (frond small, simple, 3-lobed), n. 21 (compound, and pinnæ much acuminated); Teapa, *Linden*, n. 1486; San Blas, and Central America, *Sinclair, Beechey* (pinnæ and pinnules much laciniated). Abyssinia, rocky, shady places, on mountains near Amba Sea, alt. 6000 feet, n. 2064, *W. Schimper.*—A variable yet well-marked species, well figured by authors, and not easily confounded with any other, except it be some very small and young states of *Aspl. firmum*, especially the form called *A. Ruizianum* by Klotzsch.

153. A. (Euasplenium) *septentrionale*, Sw.; small caudex creeping densely radiculose scarcely paleaceous, stipites numerous tufted 3–6 inches high erect flexuose green brown at

the base, fronds 1–2 inches long coriaceous glabrous pinnated, pinnæ ¾–1 inch long long-petioled linear or linear-lanceolate subunguiculate often very acute or acuminate rarely solitary generally 2–3 alternate entire or forked, lateral segments small subulate rarely laciniated (2–3 acuminate segments), veins forked parallel, sori very long, involucres also much elongated attached near the margin.—*Sw. in Schrad. Journ.* ii. *p.* 283. *Willd. Sp. Pl.* v. *p.* 307. *Schk. Fil. p.* 62. *t.* 65. *Engl. Bot. t.* 1017. *Metten. Asplen. Fil. Hort. Lips. p.* 76. *t.* 13. *f.* 21. *Moore, Ferns Nat. Print. t.* 41 *C. Metten. Asplen. p.* 141. Acropteris, *Link. Fée, Gen. Fil. p.* 77. *t.* 6 *A. f.* 1. Amesium, *Newm.* Acrostichum, *Linn. Sp. Pl. p.* 1524.

Hab. Europe, generally in mountain regions, from Norway to the extreme south; Caucasus, Ural, and Altai. Northern India: Kashmir, *T. Thomson, Jacquemont*, elev. 9000 feet, *n.* 1201 (*n.* 57 in Herb. Mus. Par.); Garhwál, 11,000 feet, *Strachey and Winterbottom, n.* 4. New Mexico!, *C. Wright, coll.* 1851–2, *n.* 2122.—There is a peculiarity in the general form of the pinnæ of this plant, and especially in the very elongated sori and involucres, but scarcely character enough to constitute a new genus (*Acropteris*), as Link has done.

154. A. (Euasplenium) *Germanicum*, Weiss; caudex short thick apparently formed by the remains of old stipites scarcely paleaceous densely rooting, stipites crowded cæspitose slender 2–4 inches long dark ebeneous-purple below, fronds 2–2½ inches long oblong pinnate or rarely subbipinnate, pinnules cuneate ½ an inch long coarsely incised tapering into a rather long slender petiole, veins forked erect, sori linear often elongated parallel, involucres white entire.—*Weiss, Pl. Crypt.* 209 (1770). *Willd. Sp. Pl.* v. *p.* 330. *Moore, Brit. Ferns Nat. Print. t.* 41 *B.* Aspl. alternifolium, *Wulf. in Jacq. Misc. Austr.* ii. *p.* 51. *t.* 5. *f.* 2. *Engl. Bot. t.* 2258. Aspl. Breynii, *Retz, Obs. Bot. t.* 32. *Sw. Syn. Fil. p.* 85. *Schk. Fil. p.* 77. *t.* 81. *Metten. Asplen. p.* 142. Amesium, *Newm.* Scolopendrium, *Roth.* Tarachia, *Pr.*

Hab. Middle and north of Europe, as far as Stockholm and Helsingfors; rare in England and Scotland, mostly in stony and mountain districts. I possess beautiful specimens gathered in Cumberland by the *Rev. W. H. Hawker*, and others, from a stone wall near Oare, on the borders of Devon and Somerset, by *N. B. Ward, Esq.* Some of the states of this are not unfrequently mistaken for *A. septentrionale*, and others for *A. Ruta-muraria*, but the three species are truly distinct.

155. A. (Euasplenium) *Seelosii*, Leibold; small, caudex short horizontal copiously radiculose above clothed with numerous long brown subulate glossy scales, stipites tufted slender scarcely 3 inches long green black at the base

glabrous flexuose or curved, frond ½–1 inch long subcoriaceous flabellato-trifoliolate canescenti-pubescent linear-oblong subpetiolate incised towards the apex, veins sunk few forked nearly erect and parallel with the indistinct costa, sori 4–6 or 8 linear oblong compact nearly parallel with the costa and covering the whole under side of the pinnæ, involucres very thin membranaceous (papery) erose at the margin. *Leibold, Flora*, 1855. 81. *p.* 348. *t.* 15. *Metten. Asplen. p.* 142. *Hook. 2nd Cent. of Ferns, t.* 26. Acropteris, *Hensl. Aspl. Europ. Var. β*, tridactylites, *Bolle, MS. in Herb. Nostr.* (frond simple or tripartite).

Hab. South Tyrol, near Salurn, in the clefts of calcareous rocks at the foot of Mount Geier, *Barthling, C. Bolle* (and *var. β*). Ambezzo, *Hausmann*, and *Sinner* and *Huter* (*Hensler*, l. c.); (this being in S. Tyrol also, it is probably not far from Salurn). A very distinct species, and assuredly the rarest and most circumscribed in locality of any known European Fern. I am indebted to Dr. Chas. Bolle, of Berlin, the able botanical explorer of the Canary Islands and of some of the Cape de Verd Islands, for the specimens figured in the 2nd Century of Ferns. The affinity of the plant is evidently with *A. septentrionale* and *Germanicum*.

156. A. (Euasplenium) ***Ruta-muraria***, L.; small, caudex short very fibrous indistinctly paleaceous, stipites tufted 2–5 inches long slender green purple below, fronds subcoriaceous about as long as the stipes deltoid bi-tripinnate, pinnules obovate or cuneate (when young simple and reniform) obtuse or truncated entire or cleft or incised at the apex, veins flabellate dichotomous, sori linear crowded sometimes elongated crowded, involucres broad erose at the margin.—*Linn. Sp. Pl. p.* 1541. *Sm. Engl. Bot. t.* 150. *Sw. Syn. Fil. p.* 85. *Willd. Sp. Pl.* v. *p.* 75. *t.* 80 *B. Moore, Fil. Brit. Nat. Print. t.* 41 *A. Metten. Fil. Hort. Lips. p.* 143. *Asplen. p.* 143. A. murorum, *Lam.* A. murale, *Bernh.* Aspl. multicaule, *Pr.* A. Matthioli, *Gasp. et Guss.* Scolopendrium, *Roth.* Amesium, *Newm.* Tarachia, *Pr.*

Hab. Throughout Europe, north and south; North Asia, Kashmir and Thibet, *Thomson*. Algeria, *Munby*. Cape, *Pappe and Rawson*. N. America: Pennsylvania, Virginia, and Kentucky (*Herb. Nostr.*).—The well-known "*Wall-Rue*" is a very variable Fern, of which Moore has enumerated ten states. The most remarkable is the var. *cuneatum*, which approaches in the general form of its pinnules so near the *Aspl. Germanicum*, that it has not unfrequently been mistaken for it.

157. A. (Euasplenium) ***fissum***, Kit.; caudex small woody creeping radiculose paleaceous with black subulate scales, stipites tufted slender 2–3 inches long brown and glossy below, fronds 2–4 inches high 3-4-pinnate, pinnæ and pinnules petiolate divergenti-patent, ultimate pinnules linear-

cuneate the apices bifid, petioles and zigzag rachises compressed (so herbaceous and broad and the segments so narrow that the frond might justly be considered as 3–4-pinnatifid with narrow-linear divaricating segments), veins solitary in each segment, sori oblong solitary small yet occupying nearly the diameter of the pinnules, involucres pale reddish-brown subconvex entire.—*Kit. in Willd. Sp. Pl.* v. *p.* 348. *Metten. Asplen. p.* 142. *Moore, Ind. Fil. p.* 130. "Aspl. angustifolium, *Guss. Pl. Rar. t.* 65. A. tenuifolium, *Guss. Pl. Rar.* x. *p.* 377. *t.* 65. A. Trettnerianum, *Jan. Flor.* 1835. 32." *Mettenius further quotes* "A. lepidum, *Pr. Verh. d. Vaterl. Mus.* 1836. 65. *t.* 3. 2, *and* A. brachyphyllum, *Gasp. ex Guss. Fl. Sicul.* v. 2. *P.* 2. *p.* 885."

Hab. Southern Germany and Italy; Austria, Hungary, Croatia, Dalmatia, Turkey. Mount Scardus, Naples (and even the Isle of Gothland, *Moore*), are given as localities for this rare plant. I possess it myself only from the Alps of Carniola, *Müller* (named *Polyp. alpinum*, Sw.), and from *Dr. Fischer*. The pinnæ of this very distinct *Asplenium* not inaptly resemble much-branched, dichotomous specimens of *Riccia*.

158. A. (Euasplenium) *Magellanicum*, Klfs.; caudex small ascending scaly at the summit the rest clothed with the remains of former years' stipites and ferruginous woolly radicles, stipites aggregated 3–5 inches high lurid-brown, fronds 3–4 inches high ovate or subdeltoid firm-coriaceous bi-tripinnate, pinnæ petiolate 1–2 inches long ovate acuminate, ultimate pinnules ½ line long rhombeo-ovate deeply and unequally 2–3-lobed, lobes ovate or subspathulate sometimes falcate toothed towards the apex, vein central forked at each lobe, sori solitary on an ultimate pinnule or lobe short oblong often marginal and dareoid, involucre broad membranaceous brown and persistent not unfrequently forced back by the pulvinate mass of capsules, rachises slender compressed slightly winged. —*Kaulf. En. Fil. p.* 175. *Hook. et Grev. Ic. Fil. t.* 180. *Gay, Fl. Chil. p.* 504. *Metten. Asplen. p.* 128. *t.* 6. *f.* 15 *and* 16 (*excl. syn.* A. abrotanoides, *Pr.*). *Moore, Ind. Fil. p.* 143.

Hab. From Cape Horn in the south to the Andes of Chili, *Commerson, Chamisso, Poeppig, Cuming*, n. 812 and 150; *Capt. King* (Port Famine), *Bridges, W. Lobb, J. D. Hooker* (Hermite Island), *M'Whinnie, Harvey, Capt. Collinson, Lechler*, n. 516. Juan Fernandez, *Bertero*, n. 1534. Isle of Massa Fuera, *Cuming*, n. 1354.—This may be considered to hold the same place in the temperate and cold regions of S. America that *Asplen. Ruta-muraria* does in the northern hemisphere. Mettenius, by including *Aspl. abrotanoides*, Pr., gives it as a native of Peru, but Moore places that plant more correctly under *A. funiculaceum*, H.B.K.

159. A. (Euasplenium) *montanum*, Willd.; caudex small

creeping copiously rooting, the apex paleaceous with brown subulate scales, stipites numerous cæspitose slender 1–3 inches long castaneous below, frond 2–3 inches long ovato-lanceolate subcoriaceo-membranaceous pinnate, pinnæ distant ½ an inch long and pinnules rhombeo-ovate or lanceolato-petiolate (petiole rather broad compressed) pinnatifid, lobes obtuse inciso-dentate, veins solitary in each segment, sori small distant oblong, involucres pale membranaceous entire.—*Willd. Sp. Pl.* v. *p.* 342. *Gray, Man. of Bot. U. St. p.* 594. *Metten. Asplen. p.* 145. *f.* 34. 35. Aspl. Adiantum-nigrum, *var.*, *Spreng. Henfl. Asplen. sp.* 66. A. Adiantum-nigrum, *Mich. Fl. Bor. Am.* ii. *p.* 265.

Hab. S. U. States: mountains of Carolina and Georgia, *Michaux, Schweinitz, A. Gray and Carey, Rugel.*—A dwarf species of *Asplenium*, as far as we yet know, to Carolina and Georgia, extremely different from *Aspl. Adiantum-nigrum*, with which Michaux and Sprengel, and even the accurate Henfler, seem to have confounded it.

160. A. (Euasplenium) ***bipartitum***, Bory; caudex erect short thickish densely clothed with woolly fibres, stipites 3–4 inches long cæspitose slender greenish-brown and as well as the slightly-winged fronds coriaceo-membranaceous pale green 2–6 inches long ovato-lanceolate subbipinnate, pinnæ distant long-petiolate 13–30 1–1½ inch long horizontally patent superior ones simple rhombeo-lanceolate coarsely serrate obliquely cuneate at the base with a sharp auricle at the superior base, the rest with one or two petiolated cuneato-incised pinnæ at the base above and rarely a similar one at the base beneath (these are much smaller than the terminal one), veins pinnated subflabellate in the lateral pinnæ simple or more rarely forked, sori linear oblique, involucres thin-membranaceous entire rarely diplazioid. (Tab. CCVIII.) —*Bory in Willd. Sp. Pl.* v. *p.* 329. *Bojer, Hort. Maurit. p.* 396. *Metten. Asplen. p.* 113. *t.* 5. *f.* 14 (*two pinnæ only*). *Moore, Ind. Fil. p.* 116. Aspl. auritum, *Wall. Cat. p.* 222, *var.* petiolatum, *Kaulfs. in Sieb. Syn. Fil. n.* 66, *and Fl. Mixta, n.* 299. Diplazium, *Pr.*

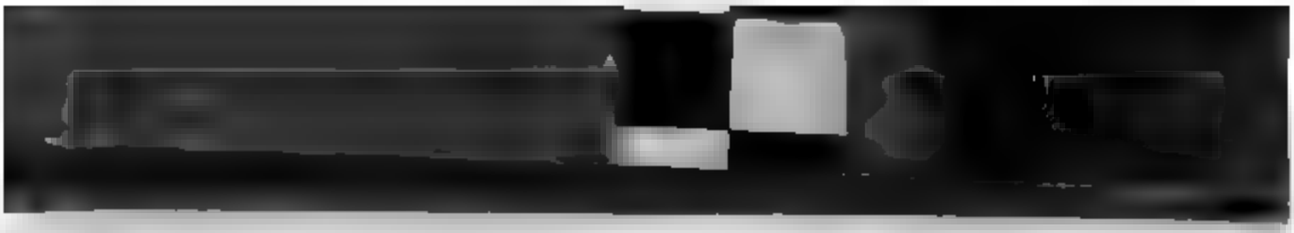
Hab. Shady woods and on trunks of trees, Mauritius, *Bory, Wallich, Carmichael, Bojer, Sieber.* Nossobé Island, Madagascar, *Boëvia, in Herb. Nostr.*—A peculiar and very distinct species, confined, as far as we at present know, to the above localities.

161. A. (Euasplenium) ***auritum***, Sw.; caudex short ascending crowned with paleaceous ovate acuminated scales, stipites cæspitose 4–6 inches long slightly winged above

lurid greenish-brown, fronds oblong or broad ovato-lanceolate acuminate pale green coriaceous truncated not contracted at the base pinnate pinnatifid at the acuminated apex, pinnæ often numerous horizontal subpetiolate 2–3 inches long straight lanceolate or linear-lanceolate acute or acuminate or oblong and obtuse the margin entire or variously toothed or serrate pinnatifid superior base generally auricled auricle often free or truncate with a subtriangular auricle sometimes the pinnæ are deeply pinnatifid in a regular manner or the pinnæ are in part or wholly again pinnated with the pinnules various in shape entire or serrated, veins oblique once or twice forked, sori oblong generally copious arranged in two series between the costa and margin often confluent, indusium rigid-membranaceous of the same colour as the frond, rachis compressed green more or less winged often so broadly (a line broad) and so uniformly that the frond may correctly be said to be pinnatifid rather than pinnate.—*Sw. Fl. Ind. Occ. p.* 1616. *Syn. Fil. p.* 78. *Schk. Fil. p.* 199. *t.* 130 *b* (portion of a wingless rachis with pinnæ, *nat. size*). *Willd. Sp. Pl.* v. *p.* 326. *Metten. Fil. Hort. Bot. Lips. p.* 73. *t.* 8. *f.* 3?, 4, 5?, 6? (These are all, according to the author, given as "var. *obtusum*," described at his p. 73, but f. 4 is almost exactly identical with Schkuhr's figure of true *auritum*.) *Lowe, Hist. Ferns,* v. *t.* 32 (pinnæ more than usually elongated and acuminated). *Metten. Asplen. p.* 103. *Moore, Ind. Fil. p.* 115. A. monodon, *Liebm. Fil. Mex. p.* 96.

Hab. Tropical and subtropical America. West Indies, *Sloane and others.* Jamaica, *Bancroft and Purdie* (pinnæ singularly cuneato-attenuate at the base, often with a lanceolate auricle at each side). Dominica, *Sieb. Syn. Fil. n.* 171. Mexico, *Liebmann, Jurgensen, n.* 637, 1523, and 900. Guatemala, *Skinner* (one specimen long and finely acuminated). New Granada, *Schlim, n.* 465; *Cuming, n.* 1269 and 1230; *Birschel.* Peru, *Poppig* (from Kunze). Tarapota, *Spruce, n.* 3956. Ecuador, Andes of Quito, 6000 feet, *Jameson, n.* 391 (some specimens almost passing into *A. fragrans*) and 731. Panama and Isle of Gorgona, *Seemann.* Chatham Islands, Galapagos, *Capt. Wood* (one specimen partially bipinnate). Brazil, Rio, *Gardner, n.* 41; *Vaulier* (two fronds *from the same caudex*, one the normal form, the other bipinnate). San Gabriel, on the roots of trees, *Spruce, n.* 2275. Surinam, *Hostmann, n.* 168 (approaching the var. *obtusum* of Mettenius). East Indies: rocky and stony places in woods near Ootacamund, Neilgherries, *M'Ivor.*

Var. *macilentum*, Moore; pinnæ usually shorter and more obtuse, auricle often obsolete, rachis with a very broad wing. —A. macilentum, *Kze. in Kl. Linnæa,* xx. *p.* 351 (*et in Herb. Nostr.*). *Fée, Gen. p.* 192. A. auritum, *β* obtusum, *Kze. in Linnæa,* xxiii. *p.* 222. *Metten. Fil. Hort. Lips. p.* 73. *t.* 8.



f. 3, 5, 6. (A. umbrosum, *Schrad. and Klfs.*, A. cuneatum, *Klf.*, Polypodium serratum, *Aubl. and Lam.*, Aspl. Schottii, *Pr.*, A. prolixum, *Schrad.*, and A. pyramidatum, *Liebm.*, are included, probably quite correctly, under *A. auritum*, Sw., and under nearly as many designated varieties as there are names, by Mettenius.)

Hab. The same regions as the first or normal form, and I shall be brief in noticing a few of the localities from my herbarium. Venezuela, *Fendler*, n. 141. New Granada, *Schlim*, n. 60. Jamaica, *Hartweg*, n. 1503 (subvar. *pinnatifidum*, Tab. Nostr CCVII. This, though not authentic "*macilentum*," not derived from an authentic source,—is, nevertheless, the most peculiar of the forms; for, owing to the remarkable decurrency of the pinnæ, these are so united as to constitute a truly pinnatifid frond). British Guiana, *Schomburgk*, n. 1168. Columbia, *Moritz*, n. 100 (original specimens from Dr. Klotzsch, but they are in reality a most trifling variety, with and without auricles, and obtuse or quite acuminated pinnæ); *Holton*, n. 62. Venezuela, *Fendler*, n. 142. Sierra Nevada, Rio Hacha, New Granada, *Schlim*, n. 1032. Caracas, *Linden*, n. 532. Mexico, *Galeotti*, n. 6392.

Var. *rigidum;* pinnæ deeply pinnatifid or more or less pinnate.—A. rigidum, *Sw.* "*Vetensk. Acad. Handl.* 1817, *p.* 68." A. auritum, *var. d. β, Metten. Asplen. p.* 104. A. dispersum, *Kze. in Linnæa*, xxiii. *p.* 304. *Metten. Fil. Hort. Lips. p.* 76. *t.* 9. *f.* 5, 6. A. recognitum, *Kze. Herb., and Fée, Gen. p.* 191 (*name only*). Lonchitis dentata, etc., *Plum. Fil. t.* 46.

Hab. Tropical and subtropical America: fronds often received with the two preceding forms, evidently gathered as the same species, and, not unfrequently, derived from the same caudex. Martinique, *Plumier*. Portorico, *Schwanecke* (Kunze's *A. recognitum*, the same caudex affording fronds which are *A. auritum normale*, and fronds almost wholly bipinnate, marked "*A. rigidum*" by Moore). Caracas, *Birschel*. Brazil, *Swainson* (fronds simple pinnate, others bipinnate). Organ Mountain, (all bipinnate), Rio, *Gardner*, n. 180, and Serra de Predade, *Gardner*, n. 5311 (all bipinnate, and with all the rachises broadly winged), *Sellow, Mr. Fox, Tweedie* (exactly *A. dispersum*, Kze.). Peru, *Matthews*, n. 1853, deeply and regularly pinnatifid, the lowest superior lobe forming an auricle. Tarapota, *Spruce*, n. 4677 (A. dispersum, *Kze.*). Mexico, elev. 3–4000 feet, *Galeotti*, n. 6391. West Indies, Dominica, Coulibaban Mountains, *Dr. Imray*, n. 81. Bourbon!, *Herb. Mus. Paris* (pinnæ pinnatifid, and pinnate): I may add, too, that my Neilgherri specimens (mentioned under *N. auritum verum*) exhibit some pinnæ of var. *macilentum* and others bipinnate, as in the present variety.—Nothing but a careful study of numerous suites of specimens, such as I am privileged to have before me, of this Protean *Asplenium*, can, or ought to, satisfy any one that all the forms enumerated above (Mettenius brings under it eleven varieties or subvarieties), and another (*A dispersum*) retained by him as a species, must be brought within the limits of one and the same species, *A. auritum* of Swartz. But this is not all that needs consideration; Mettenius, in his 'Adnotationes,' under *A. fragrans* (it is to be lamented that he has not favoured the public with more such *adnotationes*), says of *A auritum*, Kze., *A. dispersum*, Kze., *A. fragrans*, Sw., *A. Mexicanum*, Mart. et Gal., *A. fœniculaceum*, H.B.K., together with *A. delicatulum*, Pr., that they are "species certe arctissime

conjunctæ, nisi omnes (vel omnes *A. delicatulo* excepto) varietates unius speciei." Further observations will, I have little doubt, confirm this view of Dr. Mettenius; but as at present I find a greater break between *A. auritum* and the still more compound and finely cut group of which *A. fragrans* may be considered the type, but which varies as much in itself as *A. auritum* does, I am at present disposed to keep these two distinct.

162. A. (Euasplenium) *fragrans*, Sw.; caudex short thick erect or oblique densely rooting (in very young plants it appears to be flagelliform), stipites tufted 3–5 inches lurid-green with large opaque deciduous ovato-lanceolate scales at the base, fronds 4 inches to a span and more long whitish-green coriaceous firm opaque ovate or oblong-ovate acuminate bi-tripinnate, primary pinnæ petiolate ovato-lanceolate often much acuminate 2–3 inches long, secondary ones shortly petiolate oblong acute or acuminate lobato-pinnatifid with rather narrow erecto-patent sharply serrated segments, ultimate ones or pinnules 3–4 lines long cuneato-oblong serrate at the obtuse or acute apex, veins erecto-patent parallel simple, sori nearly parallel with the costa and near the centre of the pinnules soon confluent, involucres pale membranaceous oblong, rachises alato-compressed.—*Sw. Fl. Ind. Occ.* iii. *p.* 1612. *Syn. Fil. p.* 84. *Willd. Sp. Pl.* v. *p.* 345. *Metten. Asplen. p.* 104 (*excl. syn. of Schk., which is* A. furcatum). *Moore, Ind. Fil. p.* 133. Tarachia, *Pr.* A. Mexicanum, *Mart. et Gal. Fil. Mex. p.* 62. *t.* 15. *f.* 4, *and Liebm. Fil. Mex. p.* 97 (according to original specimens from both). A. planicaule, *Lowe, Hist. of Ferns*, v. *t.* 10 (faithful, if not elegant: but certainly not *A. planicaule* of "Wallich," nor is it "from the *island* of Mexico," nor from "several parts of the East Indies").—Var. *fæniculaceum;* mostly tripinnate, the secondary pinnæ and pinnules narrower, the segments deeper and more finely cut, sometimes so narrow as to be almost setaceo-spinulose. *Metten. Asplen. p.* 104. A. fœniculaceum, *H.B.K. Nov. Gen. Am.* i. *p.* 15. *Hook. et Grev. Ic. Fil. t.* 92. *Moore, Ind. Fil. p.* 132. A. coriifolium, *Liebm. Fil. Mex. p.* 97. A. abrotanoides, *Pr. Rel. Hænk.* i. *p.* 47. *t.* 8. *f.* 2. A. tenellum, *Fée, Gen. p.* 198. Cænopteris, *Desv.*

Hab. West Indies; Jamaica, *Swartz, Menzies*, and all succeeding travellers, *Dr. Alexander Prior* (Blue-mountain Peak), *Purdie* (Portland, connecting it with *A. fæniculaceum*). Cuba, *Wright*, n. 857, accompanied by a specimen of *A. deliculatum*. Guadeloupe, *L'Herminier*, n. 11; *Parker*. Dominica, *Dr. Imray*, n. 55. Mexico, *Jurgensen*, n. 963 and n. 789; Oaxaca, 5000 feet elev., *Galeotti*, 6547. Mirador, *Liebmann* (A. Mexicanum, *Lieb.*). Columbia; Veraguas, *Seemann*, n. 1548. Merida, n. 363 (quoted by Moore and Mettenius as *A.*

fœniculaceum, and n. 362, "A. rigidum, *Sw.*" (*Klotzsch*). Brazil; St. Catharine's, *Mr. Fox*. Andes of Quito, near Papallacta, *Jameson*.—Var. *fœniculaceum*. Tropical America; New Andalusia, *H B.K.* Andes of Quito, *Jameson*, n. 2 and n. 271: in woods, with long acicular segments. Peru, *Matthews*, n. 1110. Tarapota, Eastern Peru, *Spruce*, n. 4035. New Granada, 7–8000 feet elev., *Schlim*, n. 632, 883, and 959 (passing into the true *A. fragrans*). Valparaiso, *Bridges*, *Cuming*, n. 324 (Cordilleras). Mexico, *Jurgensen*, n. 944. *Liebmann* (A. corifolia, *Liebm.*). West Indies; Jamaica, n. 1523.—I cannot better illustrate the difficulty attending, though correctly discriminating, the limits of the present species, and some of its allies, than by referring to the 'Annotationes' quoted from Mettenius under our last species, *A. auritum*. A careful examination of my copious series of specimens confirms all that is said there. the more compound forms of that species seem to pass insensibly into *A. fragrans*, as *A. fragrans* does still more evidently into *A. fœniculaceum*. My greatest difficulty is with *A. delicatulum*, to be next described. I have with little hesitation referred Fée's *Aspl. tenellum*, from "Quito, *Jameson*," to one of the many forms of the var. *A. fœniculaceum*. it is the finest cut of any of the varieties. I do not know which may be the *A. tenellum* alluded to by Mr. Moore.

163. A. (Euasplenium) ***delicatulum***, Pr.; caudex very slender creeping thread-like and flagelliform, stipites from ½ to 1½ inch high filiform, fronds membranaceous very delicate barely 2 inches long ovato-lanceolate bipinnate, primary pinnæ not exceeding ½ an inch long deeply pinnatifid or again pinnate, pinnules and segments linear-oblong acute single-veined, sori oblong rarely more than one in each lobe or pinnule distant from the margin, involucres pale membranaceous.—*Pr. Rel. Hænk.* i. *p.* 47. *t.* 7. *f.* 3, *and in Linnæa*, ix. *p.* 109. *Hook. Ic. Pl. t.* 918. *Metten. Asplen. p.* 105. *Moore, Ind. Fil. p.* 128.

Hab. Andes of Quito on trunks of trees, Cuchaos, *Hænke, Pappig*. Venezuela, *Fendler*, n. 454. Santa Maria, *Purdie*. Cuba, *C. Wright*.—I have, in my 'Icones Plantarum,' above quoted, expressed my doubts respecting the validity of this as a species. Small and delicate as it is, it comes very near to some of my young specimens of *A. fragrans*, var. *fœniculaceum*, in which state they exhibit (v the figure in Icones Fil. t. 92) surculi from the roots, or, in other words, a filiform creeping caudex. The general aspect of this is at first sight that of a delicate *Trichomanes*. Some of Fendler's specimens seem to pass gradually into small specimens of *A. fœniculaceum*.

164. A. (Euasplenium) ***setisectum***, Bl.; "fronds bipinnate (bipinnatifid above) subcoriaceous glabrous, pinnæ petiolate lanceolate (in circumscription) very acuminate, pinnules sessile cuneato-oblong obtuse from the middle to the apex setaceo-inciso-serrate striated, superior ones linear incised at the apex confluent, rachis subpaleaceo-hirsute." *Bl. En. Fil. Jav. p.* 187.—*Metten. Asplen. p.* 159. *Moore, Ind. Fil. p.* 168. Tarachia, *Pr.*

Hab. Rocks on mountains in Java.—"*Aspl. fragrans*, Sw., differs in the acute pinnules only serrated at the apex."

165. A. (Euasplenium) *lacerum*, Schlecht. and Cham.; "stipes 3–5 inches long clothed at the base with ovate obtuse rigidly membranaceous scales, frond membranaceous or subcoriaceous glabrous pale green 4–5½ inches long oblong acuminate subpinnate, primary pinnæ 5–7 pairs erecto-patent 1–1½ inch long petiolate from a cuneate trapezio-ovate or oblong base attenuated at the apex and obtuse pinnati-partite, the superior base pinnatisect, segments on each side 3–4, superior basal ones 6–8 lines long from a cuneate base spathulato-oblong obtusely inciso-serrate, superior ones confluent by means of a broadish wing oblong obtuse inciso-dentate, veins conspicuous 2–3 standing out at an angle of 15–20° forked or undivided, sori on each side 1–3 2½ lines long elongate occasionally at the base of the laciniæ of the segments diplazioid, involucre rigidly membranaceous pale evidently passing into the parenchyma." *Metten.—Schlecht. and Cham. in Linnæa*, v. *p.* 612. *Metten. Asplen. p.* 106. *t.* 5. *f.* 26 (*pinnule only*). *Moore, Ind. Fil. p.* 139. Tarachia, *Pr.*

Hab. Mexico (*Cham. et Schlecht.*).—Placed by Mettenius, whose character I have given above, with *A. fragrans*, Sw., and its allies.

166. A. (Euasplenium) *scandicinum*, Klfs.; caudex erect or declined stout sparingly paleaceous, stipites tufted a span to nearly a foot long brownish-green, fronds a foot and more long coriaceo-membranaceous somewhat glossy broad-lanceolate bi- below tri-pinnate, pinnæ 2 inches long petiolate lanceolate, pinnules subobliquely obovato-cuneate petiolulate obtuse obscurely auricled at the superior base ¼ an inch long strongly serrated at the apex and on the superior margin, ultimate ones of the pinnæ confluent into a deeply serrated acumen, veins subflabellate, sori solitary rarely 2 on a pinnule pulvinate, involucre small whitish soon concealed by the capsules of the sorus. (TAB. CCIV.)—*Klfs. En. Fil. p.* 177. *Metten. Asplen. p.* 116? (*excl. syn. Gardn. n.* 178).

Hab. Brazil, *Chamisso*. South Brazil, *Sellow* (*ex Herb. Reg. Berol.*), *Tweedie*. —This is probably a rare plant; I have seen only the specimen from *Herb. Reg. Berolinense*, from which our figure and description are made, and one from Mr. Tweedie, both from South Brazil. It seems very distinct, and is remarkable for the usually solitary and large sorus on the pinnule. I quote Mettenius with a mark of doubt, because his description does not accord sufficiently with my plant, and because he includes Gardner's n. 178, which is undoubtedly *Asp. adiantioides*, Raddi.

167. A. (Euasplenium) *acuminatum*, Hook. and Arn.; caudex creeping nearly as thick as a goose-quill, stipites subag-

gregate a span or more high stout lurid-brown, fronds 1½–2 feet long broad ovato-lanceolate acuminate subcoriaceo-membranaceous dark brown when dry bipinnate pinnate towards the apex, pinnæ horizontally patent subsessile broad-lanceolate acuminate pinnatifid at the point, pinnules straight or subfalcate or even decurved approximate venoso-striate an inch long from a broad unequally cuneate base lanceolate or rhomboideo-lanceolate acuminate (sometimes rather finely so) incisedly pinnatifid superior base truncate auriculate, inferior more or less excised, superior pinnæ small pinnatifid with a separate auricle at the base, veins pinnate forked obliquely erect in the broader pinnules more flabellate with the costa indistinct, sori copious linear in two parallel oblique lines extending to the margin, in the auricles sometimes diplazioid, rachises terete, smooth. (TAB. CCVI.)—*Hook. et Arn. Bot. Beech. Voy. p.* 106. *Brack. Fil. U. S. Expl. Exp. p.* 164. *Metten. Asplen. p.* 159. *Moore, Ind. Fil. p.* 109.

Hab. Sandwich Islands; Oahu, *Ley and Collie, M'Rae*: abundant on the high mountains above Honolulu, *Brackenridge*.—Although undoubtedly variable in the form of the pinnules, longer or shorter, broader or narrower, there is no difficulty in recognizing this species: the only question is, whether, in consequence of a double sorus seen here and there on the auricles, it may not be right to refer the plant to the diplazioid group of *Asplenium*.

168. A. (Euasplenium) *Jamesoni*, Hook.; stipes compressed and pale brown (as is the lower portion of the main rachis), frond 14 inches long 10 broad ovate acuminate firm subcoriaceo-membranaceous bipinnate pinnate above the apex pinnatifid, pinnæ petiolate, pinnules 1–1½ inch long sessile (the lowest ones only subpetiolate) distant all from a cuneate base lanceolate acute or obtuse inciso-pinnatifid, teeth or segments subacute or obtuse and 2-toothed, veins pinnated remote erecto-patent, sori in two series close to and parallel with the costa not extending to the segments large occupying the whole disc of the pinnules linear-oblong, involucres pale brown very thin and membranaceous, partial rachises and upper half of main rachis green and singularly ancipiti-compressed a line wide costate. (TAB. CCV.)

Hab. Guaiaquil, Ecuador, *Jameson*.—One of the most distinct of all *Asplenia*, and a very beautiful species, remarkable for the very broad (or they may be called alate) partial rachises, and for the large sori arranged in two parallel lines close to the costa of the pinnules.

169. A. (Euasplenium) *pseudo-nitidum*, Raddi; stipes a foot or more long and as well as the rachises purplish-black

sparingly and deciduously villoso-paleaceous, frond 1–1½ foot long subovate acuminate membranaceous bipinnate dark-green pinnate at the apex, pinnæ petiolate 4–5 inches long remote from a broad base ovato-lanceolate acuminate pinnate in the lower half, the upper half lobato-pinnatifid, pinnules petiolulate 1–1½ inch long, lowest ones petiolate from a broad obliquely cuneate base obtusely auricled on each side ovate, intermediate ones rhomboideo-ovate obtuse and as well as the lobes and apices finely and closely serrated sometimes apiculate, veins pinnate rather distant terminating within the margin, sori in two series linear oblique not extending to the margin inferior ones not unfrequently diplazioid, involucres pale brown membranaceous, secondary rachis pale green partially winged by the decurrent base.—*Raddi, Fil. Bras. p.* 39. *t.* 55. *Metten. Asplen. p.* 127. *t.* 5. *f.* 21. A. Martinicense, *Raddi, Syn. Fil. n.* 98.—Var. *β. crenatifolium;* stipes and rachises dark purple-ebeneous, frond deltoideo-ovate subtripinnate below, pinnules obtuse crenulate.

Hab. Brazil; Mount Frade, *Raddi.* Rio, Organ Mountains, *Gardner*, n. 179. —Var. *β.* Organ Mountains, elev. 4000 feet, *Gardner.*—My specimens of this handsome Fern exhibit two forms, which I dare not venture to consider distinct. In the very glossy and ebeneous stipes and rachis the var. *β* mostly resembles the figure and description of Raddi, but differs in the very obtuse pinnules and in the bluntly crenated, not serrated margins.

170. A. (Euasplenium) *Lindeni*, Hook.; caudex . . . , stipes 6 inches and more long stout and as well as the entire main rachis intensely glossy-black, frond ovate a foot and more long chartaceous opaque dark lurid-green bipinnate, pinnæ 24 or more 4–5 inches long rather distant broad-lanceolate subhorizontally patent moderately acuminate, pinnules shortly petiolate rhombeo-ovate or obovate subacute coarsely and unequally serrated, the base entire superior parallel with the rachis inferior subexcised terminal ones subconfluent, rachis herbaceous dark-coloured below (not at all ebeneous), veins only seen when the frond is held between the eye and the light pinnated erecto-patent rather distant simple or forked terminating within the margin and clavate, sori few sparse short linear, involucres dark-brown. (TAB. CCIX.)

Hab. Forest of Ocaña, New Granada, elev. 7000 feet, *Schlim*, n. 608 (received from *J. Linden*).—Although I possess but one specimen of this *Asplenium*, and that destitute of caudex, it is so distinct from any species known to me, that I can

have no hesitation in characterizing it as new. In size and composition it resembles *A. pseudo-nitidum* of Raddi, but the texture of the frond is very different, the pinnæ much less acuminated, the pinnules much more coarsely and unequally serrated, the sori much shorter and very few in number, but above all the stipes and main rachises are the most glossy ebeneous-black of any species I am acquainted with.

171. A. (Euasplenium) *squamosum*, Linn.; caudex inclined (repent?) stout as thick as a man's finger paleaceous with large membranaceous fimbriated scales, stipes in like manner paleaceous stout pale-brown thicker than a swan's-quill 1½ foot long, frond ample 2–3 feet or more long (Karsten says 6 ft.) broad-ovate bright-green rather opaque subcarnoso-membranaceous bipinnate, pinnæ large very patent (3–4 inches apart on each side) 7–8 inches long 4 inches and more broad, pinnules large 1–1½ inch apart petiolulate 2½–4 inches long 1½ to nearly 2 inches broad rhombeo-ovate acute or more or less acuminate, the base cuneate unequal-sided entire unequally and subduplicato-serrate or sublobato-serrate, superior base more or less extended and even auricled (rarely bearing a single pinnule there), teeth or serratures generally obtuse, ultimate pinnules confluent, veins oblique often twice or thrice forked subflabellate, sori linear ¼ to ⅜ of an inch long parallel with the costa except in the auricle, rachis much compressed green winged. (Tab. CCX.)—*Linn. Sp. Pl. p.* 1539. *Sw. Syn. Fil. p.* 83. *Willd. Sp. Pl.* v. *p.* 343. *Mettен. Aspl. p.* 168. Aspl. magnum, *Karst. Fl. Columb.* i. *p.* 69. *t.* 34. Lingua cervina ramosa, *Plum. Fil. p.* 86. *t.* 103.

Hab. Hispaniola, rare, *Plumier*. Venezuela; Tovar, n. 132, *Fendler*. Cordillera of Bogotá, *Karsten*.—This is one of the most remarkable and striking of the genus. Assuredly among the bipinnated or decompound species of the genus, there is none that approaches it. Some of the most acuminated of the pinnules have a distant resemblance to the ordinary pinnæ of *Aspl. Serra*, especially in the direction of the sori, but here we have a perfectly bipinnate plant, and the texture of the frond is different, and the scales of the caudex and stipes are totally different. The species seems to be extremely rare. Plumier records it as such. His figure and description leave no doubt of the identity of his plant with ours, consequently it is the *Aspl. squamosum* of Linnæus, Swartz, and Willdenow, who only take up the species from Plumier. It has recently been detected by Fendler in Venezuela, and by Karsten in the Cordillera of Bogotá, at an elevation of 8000 feet.

172. A. (Euasplenium) *adiantoides*, Raddi; caudex short stout subrepent crowned with subulato-setaceous black scales, stipites aggregated a span to 1 foot long slender, brownish below paler upwards, fronds 1–1½ foot and more long ovate or ovato-lanceolate acuminate membranaceous tender green 3–4-pinnate, pinnæ long-petiolate distant spreading their

apices slender caudate pinnatifid, ultimate pinnules rather long-petiolulate from a cuneate base rhomboid-truncate or acuminate variously incised or pinnatifid in the upper half and dentate, veins pinnated not extending to the margin distant, sori linear in two oblique series or rows, in the broader pinnules remote from the margin, in the narrow segments dareoid, involucres pale brown, rachises slender almost filiform.—*Raddi, Syn. Fil. Bras. p.* 101. *Fil. Bras. p.* 40. *t.* 51 (a rough but faithful figure). *Metten. Asplen. p.* 127. *t.* 5. *f.* 20 (2 pinnules only, much broader and more flabelliform than in our specimens). *Moore, Ind. Fil. p.* 109. *Fée, Gen. Fil. p.* 192.

Hab. Brazil, Minas Geraes, *Raddi;* St. Catharine's, *Forbes, M'Rae.* On the trunks and branches of large trees, Rio, *Gardner*, n. 177 and 178. Jamaica, *M'Fadyen, in Herb. Nostr.*—An elegant, graceful, and very distinct Fern.

173. A. (Euasplenium) *serrulatum*, Cav.; "fronds bipinnate, pinnæ pinnate, pinnules petiolate cuneato-trapezoid serrate, serratures spinescent, frond lanceolate." *Cav. Annales de l'Hist. Nat.* iv. *p.* 105.—*Sw. Syn. Fil. p.* 83. *Willd. Sp. Pl.* v. *p.* 345. *Metten. Asplen. p.* 145. *Moore, Ind. Fil. p.* 167.

Hab. N. Africa; Mogador (*Cavanilles*).—Moore conjectures it may be a form of *A. Adiantum-nigrum.*

174. A. (Euasplenium) *Adiantum-nigrum*, L.; caudex stout (old ones thickly clothed with the remains of old stipites) horizontal, stipites densely tufted castaneous and generally ebeneous at the base often a span and more long, frond a span to a foot and more long ovate or ovato-oblong acuminate firm membranaceo-coriaceous nitent bi-tripinnate, primary pinnæ petiolate ovato-acuminate, secondary also petiolate, tertiary usually sessile from a cuneate base ovate or oblong or lanceolate or even linear more or less acuminate but obtuse inciso-pinnatifid lobes coarsely and subspinuloso-serrate, veins pinnated erecto-patent, sori copious approximate linear-oblong at length confluent, involucres firm-membranaceous pale brown entire, rachises alate.—*Linn. Sp. Pl. p.* 1541. *Sw. Syn. Fil. p.* 84. *Willd. Sp. Pl.* v. *p.* 346. *Schk. Fil. p.* 74. *t.* 80 *a. Engl. Bot. t.* 1950. *Metten. Asplen. p.* 144. *Moore, Ferns Nat. Print. t.* 36. *Moore, Ind. Fil. p.* 109. A. Oreopteris, *L.* (according to Moore; but Mettenius refers this to the var. *acutum*). A. argutum, *Klfs. En. Fil. p.* 176. A. humile, *Bl. En. Fil. Jav. p.* 185. A. Silesiacum,

Milde. A. nigrum, *Bernh.* A. luridum, *Salisb.* A. Capense, *L.* (*fide Moore*). Tarachia, *Pr.*—Var. β. *acutum*, Pollin; pinnæ pinnules and segments narrower often linear acute or acuminate. *Moore, Brit. Ferns Nat. Print. t.* 37. A. acutum, *Bory, in Willd. Sp. Pl.* v. *p.* 347. A. productum, *Lowe, Trans. Cambr. Phil. Soc.* vi. *p.* 524.—Var. γ. *obtusum*, Moore; pinnules and lobes very broad more acutely dentate. A. Ad. nigr. *v.* Capense, *Schlecht. Adumbr. Fil. Cap. p.* 31. *t.* 18 (*excellent*). A. obtusum, *Kit. Willd. Sp. Pl.* v. *p.* 341. A. cuneifolium, *Vis. Fl. Ital. Fragm. p.* 16. *t.* 18. A. Serpentini, *Tausch. and Henfl. Aspl. Europ. p.* 81. *t.* 1, 2. Mr. Moore refers hither, A. fissum, *Weinm.*, A. Forsteri and A. novum, *Sadl.*, A. incisum, *Opiz.*, A. multicaule, *Scholtz.*, and A. tabulare, *Schrad.*—Var. δ. *Gaudichaudianum*, Hook.; fronds firm-coriaceous very opaque brown when dry ovato-lanceolate acuminate subcaudate tripinnate, primary pinnæ petiolate lanceolate, secondary pinnæ and pinnules remote oblong or linear-oblong obtuse the margin sharply pinnatifido-serrate, veins erecto-parallel, sori copious on all the pinnæ and pinnules parallel with the rachis confluent, involucres oblong brown often so close as to be imbricating, the margin slightly erose, all the rachises destitute of wing.—A. patens, *Gaud. in Freyc. Voy. p.* 320. A. Adiantum-nigrum, *Brack. in Fil. U. S. Expl. Exp. p.* 165. *Metten. Asplen. p.* 144.

Hab. α, β, γ. Throughout Europe, Greece, and Northern Asia; Turkey, the shores and islands of the Mediterranean, N. and S. Africa, Madeira, the Canaries, Azores, Cape de Verd Islands, St. Helena, Abyssinia, *Schimper, n.* 669 and 1356. Northern India, Afghanistan, Mussoorie (*Baron*), Kashmire and Simla, *Griffith, Edgworth, Hook. fil. and Thomson.* Mascaren Islands, *Bory.* Java, *Blume.*—In the new world Virginia is given on the authority of a specimen in the herbarium of the *British Museum* (Moore), but it is nowhere recorded in the Floras of the United States (except where the *A. montanum* of Willd. has been mistaken for it), and "Portorico, *Herb. Willd.*" (Moore).—Var. δ. Mouna Roa and other mountains, Sandwich Islands, *Gaudichaud, Douglas, n.* 55, *Brackenridge*, elev. 8–10,000 feet.—Extended as is the geographical distribution of this well-known English Fern, I have never seen any specimens from either N. or S. America. Those two localities above given rest on the authority of the Banksian and Willdenowian Herbarium. Nor have I seen any specimens from Java or from the Mascaren Islands. I cannot join Mettenius in recording the numerous varieties and subvarieties "ab Henfler (l. c.) expositæ." Those I adopt from Moore satisfactorily include the ordinary forms found in England, including the narrow-segmented state of Bory's *A. acutum* and the broad variety denominated *A. obtusum* by Kittubel. The broadest and the most peculiar form is gathered by Mr. Milne on Table Mountain at the Cape, but the several varieties are equally, as in Europe, natives of the Cape. Of my var. δ *Gaudichaudianum* I have long felt, and still feel, doubtful whether this should be referred to the *Aspl. Adiantum-nigrum*, or whether it should constitute a distinct species: the difference is more in aspect than it is easy to describe in words. It is of a much thicker and more

coriaceous texture, as if, when fresh, it were carnose, when dry, turning brown, and very opaque. Gaudichaud says very justly, "Les fructifications sont confluentes, très-nombreuses." They are on every pinnule and segment, often imbricating and lying quite parallel with the rachis, a closely compacted row on each side.

175. A. (Euasplenium) *dissectum*, Brack.; caudex "globose," stipes nearly a span long fugaciously setose as is the channelled main rachis, frond a foot and more long in our specimens (15–18 inches, *Brack.*) ovate acuminate 3–4-pinnate coriaceous dark-brown and opaque when dry, primary and secondary pinnæ petiolate rather distant, tertiary pinnæ of 3 or 4 pinnules which are cuneato-lanceolate acute sometimes again pinnate ultimate ones one-third of an inch long entire or bi-trifid segments linear-acute, veins solitary central forking below each dichotomy, sori solitary where the veins are so, geminate on a fork and opening towards each other. —*Brack. in Fil. of U. S. Expl. Exp. p.* 170. *t.* 24 (*non alior.*). *Metten. Asplen. p.* 109. *Moore, Ind. Fil. p.* 125.

Hab. Sandwich Islands; forests of Hawaii, *Douglas*, *n.* 47, *Brackenridge*.—At first sight this has some resemblance to *Aspl. Ad. nigrum*; but it is very different in ramification and pinnules and segments, much more copiously divided, rarely bearing more than one sorus on a pinnule or segment, and never more than two. Brackenridge (whose figure, taken from a very fine specimen, is excellent) compares it with *A. patens*, Kaulf. (not Gaudich.), which is a form of *laserpitiifolium*, a very different species.

176. A. (Euasplenium) *Wardii*, Hook.; caudex stout horizontal above densely clothed with long subulate finely acuminate chaffy scales nearly half an inch long, stipes (apparently solitary) about a span long with a few similar ferruginous scales at the base stramineous glossy grooved on the anterior side as is the rachis, frond 12–14 inches long by 10 broad flaccid deltoid acuminate membranaceous dark olive-green when dry opaque (not glossy) bipinnate, pinnæ horizontal petiolate lanceolate the largest 6 inches long acuminate (the acuminated apices pinnatifid), pinnules approximate 6–8 lines long horizontal sessile subdimidiato-ovate obtuse entire or slightly sinuate the superior base truncated subauricled, inferior base a little decurrent upon the rachis terminal larger than the rest, lower pinnules an inch long lobato-pinnatifid with rounded lobes more distinctly auricled sometimes 3-toothed at the apex, veins pinnated obliquely patent simple or once or twice forked, sori oblong 4–6 on each pinna in two rows near the costa, involucres very thin and membranaceous almost white.—*Hook. in 2nd Cent. of Ferns*, *t.* 33.

Hab. Tsus Sima, an island in the Gulf of Corea, *Wilford, n.* 717.—I name this fine and most distinct species, quite unlike any known to me, in compliment to John Ward, Esq., R.N., Commander of H.M.S. Actæon, who, during a surveying voyage in the north Chinese and Japan seas, gave our botanical collector, Mr. Wilford, every facility and assistance that could be desired in herborizing on shore: the result has been a very interesting herbarium from countries never before visited by the botanist, and among them some very interesting Ferns. The habit of the present species is more that of an Aspidioid Fern than an *Asplenium*: so much so, that but for the very distinct, though young sori, I should have referred it to the group of *Lastrea* among *Aspidiea*

177. A. (Euasplenium) *lanceolatum*, Huds.; caudex short thick horizontal paleaceous with dark-brown long setaceo-subulate scales, stipites tufted 3–4 inches to a span long dark castaneous, fronds broad-lanceolate membranaceous bright-green beneath having small scattered deciduous scales bipinnate, primary pinnæ lanceolate sessile or nearly so obtuse or acuminate 1–2 inches long inferior ones remote, pinnules crowded (often confluent especially towards the apices) broad-ovate or obovate serrato-dentate the teeth sharp and apiculate, veins forked moderately patent, sori submarginal at first small at length large and confluent, involucres small whitish membranaceous oblong patent entire rarely hippocrepiform. —*Huds. Fl. Ang.* ii. *p.* 454. *Engl. Bot. t.* 240. *Moore, Brit. Ferns, Nat. Print. t.* 35 *B. Metten. Asplen. p.* 140. Aspl. rotundatum, *Kaulf.* A. Billotii, *Schultz.* Athyrium, *Henft.* Tarachia, *Pr.*—Var. *obovatum;* fronds smaller, pinnules less sharply toothed, *Metten., Moore.* A. obovatum, *Viv. Fl. Lib. Specim. p.* 68. *Hook. et Grev. Ic. Fil. t.* 147. A. Forsteri, *Sadl.* Athyrium, *Fée.* Tarachia, *Pr.* (*Moore has also a var.* microdon, *Ind. Fil. p.* 140. A. microdon, *var.* microdon, *Moore, Brit. Ferns, Nat. Print. under t.* 38.)

Hab. Warmer parts of Europe, especially Greece, Spain, Portugal, islands of the Mediterranean, extending north to the southern parts of Great Britain. Algeria, Madeira, Azores; St. Helena, *J. D. Hook. in Herb. Nostr.*—A very distinct species, reaching its northern limit in the southern districts of the British Isles. Of this species the *A. obovatum*, Viviani, is a very trifling variety. My var. *elegans*, from Hongkong, I now consider a truly distinct species, the next to be described.

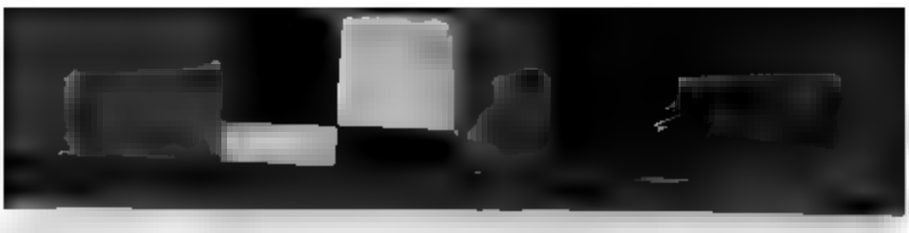
178. A. (Euasplenium) *elegantulum*, Hook.; caudex stout (in age) horizontal paleaceous at the apex with subulate brown scales, stipites tufted short 1–2–3 inches slender green, fronds elongato-lanceolate acuminate membranaceous bright green much attenuated below 4 inches to a span long bipinnate, below simply pinnate with remote dwarfed flabellate or reniform pinnæ, the rest of the pinnæ ½–¾ of an inch

long ovate or ovato-lanceolate nearly sessile again pinnate in their lower half, pinnules ovate or subrhomboid or obovate 1–1½ line long very sharply dentate superior ones on the frond and pinnæ confluent, veins forked moderately patent flabellate in the lower pinnæ, sori copious at length confluent, involucres large for the size of the pinnules white oblong lax subathyroid, rachis submargined.—*Hook. 2nd Cent. of Ferns, t.* 28. Aspl. lanceolatum ?, *var.* elegans, *Hook. in Florul. Hongkong. Kew Gard. Misc.* ix. *p.* 342. *Moore, Ind. Fil. p.* 140. *Metten. Asplen. p.* 141. Athyrium fontanum, *Eaton, in Asa Gray's Bot. of Japan,* vi. *n. ser. of Mem. Am. Acad. Arts and Sc. p.* 421 *and p.* 436.

Hab. Island near Chusan, *Alexander*. Port Hamilton and Tsus Sima, Islands in Corea Strait, *Wilford, n.* 753. Japan; Nangasaki, *Miss Nelson, Babington*. Hakodadi, *Dr. Baines*, of H.M.S. Sibylle. Simoda, *C. Wright*.—I had placed this delicate species dubiously under the *Asplenium lanceolatum* as var. *elegans*, observing, however, that "future observations may prove it to be a new species;" and such more copious specimens than I then possessed justify me in considering it to be so. Eaton is disposed to consider it a form of *A. fontanum*, but the habit and structure are very different: and its nearest affinity, I think, is clearly with *A. lanceolatum*: than which it is much smaller and more delicate, the frond narrower, tapering remarkably below with dwarfed flabelliform pinnæ; the rest of the frond, though truly bipinnate, has the pinnules, especially above the middle of the pinnæ, more frequently confluent: the involucres are much larger and more decidedly athyroid. *A. varians* is known from this by its generally smaller size, different outline of the fronds, and the cuneate pinnules, which are variously inciso-laciniate.

179. A. (Euasplenium) *Abyssinicum*, Fée; caudex ascending rather stout fibrous rooting above clothed with lanceolate glossy brown scales, stipites cæspitose 3–4 inches to a span long stout and as well as main rachis glossy purple-ebeneous, fronds a span to 1½ foot long broad lanceolate acuminate tender membranaceous pellucid, bright-green, bi-tripinnate, pinnæ sessile or nearly so lanceolate remote 2–4 inches long, secondary pinnæ ovate sessile, pinnules rhomboid ovate or subrotund cuneate at the base subpetiolate entire or 1–3 or 4-lobed, a single vein forks off towards the lobes, sori always remote from the margin at first small solitary on each lobe afterwards prominent and pulvinate, involucres small thin membranaceous, partial rachises all broad compressed green. *Fée, Gen. Fil. p.* 199. *Metten. Asplen. p.* 129. *t.* 5. *f.* 29. *Moore, Ind. Fil. p.* 109. Aspl. cuneatum, *Schimp. Pl. Exsicc. It. Abyss.* 1842, *n.* 679, *and n.* 668, *of Schimp. in Herb. Mus. Par.* 1858.

Hab. Shady places, middle region of Mount Silke, Abyssinia, *Schimper*.—At first sight this delicate and rare Fern has the aspect of *Aspl. cicutarium*, but the stipites and rachises, the form of pinnules, etc., are quite different.



180. A. (Euasplenium) *varians*, Hook. and Gr.; caudex small erect densely rooting, stipites tufted slender 1–2 inches long slightly paleaceous above, fronds 2–4 inches long membranaceous lanceolate bipinnate, primary pinnæ ½ an inch long on short petioles distant petiolate patent obtuse, pinnules few on each pinna 1–1½ line long cuneate and irregularly incised subtrilobed or 3-lobed and the lobes sharply or subspinulosely incised, sometimes all the pinnules are confluent and then the pinnæ are pinnatifid, veins variously forked, sori few 2–3 on each pinnule at length confluent, involucres pale-brown membranaceous entire subathyroid.—*Hook. et Grev. Ic. Fil. t.* 172. *Kze. in Linnæa*, xxiv. *p.* 265. *Metten. Asplen. p.* 141. Aspidium varians, *Wall. in Herb. Hook.* Aspl. plebeium, "*R. Br.*" (*fide Moore*). Aspl. fimbriatum, *Kze. in Linnæa*, xviii. *p.* 117 (from the Cape).—*Var.* leptophyllum (East Indies), *Kze. in Linnæa*, xxiv. *p.* 275. Aspl. Ruta, *L.?*, *Wall. Cat. n.* 233.

Hab. Northern India, frequent, especially on the Himalayas, at elevations of 6000 to 8000 feet, from Mussoorie and Iskardo on the west (*Dr. Bacon, n.* 37 and *n.* 41, *Jacquemont, n.* 59 and *n.* 7, *Dr. Thomson*) to Bhotan on the east, *Wallich, Strachey and Winterbottom, n.* 9; *Hooker fil. and Thomson* (Lachong, 9000 feet), *Wallich, Cat. n.* 2207 (A. parvulum, *Wall. fide Moore*), *Col. Bates, Edgworth.* Nilghiri, *Wight, Schmid, Sir F. Adam, Zenker.* Ceylon, *Thwaites, n.* 3139. Cape of Good Hope, *Lady Dalhousie, Gueinzius.*—A small delicate species, easily recognized, although variable in the size of the pinnæ, and in being pinnato-pinnatifid or truly bipinnate; also the lacinæ of the incised pinnules are more or less fringed, and sometimes so elongated and narrow, as to have suggested to Kunze the name *A. fimbriatum* for the South African species found by Gueinzius. Dr. Greville's beautiful figures in Ic. Filicum, above quoted, well represent the ordinary forms of the plant.

181. A. (Euasplenium) *Fadyeni*, Hook.; caudex long-creeping paleaceo-squamose and rooting with long flexuose wiry fibres, stipites numerous but scattered erect slender 2–4 or 5 inches long flexuose sparingly paleaceous with ovate brown scales in the lower half, fronds 4–6 inches long broad-lanceolato-ovate membranaceous flaccid bipinnate blackish-green when dry, pinnæ (16–17) 1–1½ inch long horizontally patent distant lanceolate pinnate in the lower half the superior half pinnatifid, pinnules 3–5 small 2–3 lines long petiolulate distant obovato-subrhomboid obtuse obtusely sublobato-dentate scarcely and rarely subauricled, the lobes of the pinnatifid portion rounded obtuse obsoletely dentate, veins forked once or twice extending to the margin oblique, sori short oblong few on each fertile pinnule small oblong,

involucres brown lax-membranaceous subathyroid, rachis slender zigzag.—*Hook. 2nd Cent. Ferns, t.* 27.

Hab. Jamaica, *M'Fadyen.*—A remarkable species, not likely to be mistaken for any species known to me. Caudex long, creeping, clothed with broadish brown scales, which partially extend to the stipites. Fronds of a very lurid dark green colour. The whole plant has the appearance of being semiaquatic, or of growing in very wet situations. Pinnæ and pinnules always remote, the latter small, rarely exceeding 2–3 lines in length. I have seen no specimens but those sent me by the late Dr. M'Fadyen.

182. A. (Euasplenium) *fontanum*, Bernh.; caudex short thick tuberous densely rooting, stipites 1–3 inches in length slender pale brownish-green densely tufted, fronds 3–6 inches long linear- or broad-lanceolate attenuated below membranaceous bright-green bipinnate, pinnæ approximate ¼ to ½ an inch long patent or sometimes reflexed sessile ovate obtuse lowest ones dwarfed tripartite, pinnules obovate or cuneate minute ½ a line to a line long the base entire the rest coarsely and spinuloso-dentate, sori few on each pinnule or lobe at length confluent, involucres very small athyroid white thin membranaceous.—*Bernhardi, in Schrad. Neu. Journ.* 1806, i. *part* 2. *p.* 26. *Sw. Syn. Fil. p.* 57. *Willd. Sp. Pl.* v. *p.* 272. *Engl. Bot. t.* 2024. *Metten. Asplen. p.* 140. Athyrium, *Roth.* Aspl. Halleri (frond linear-lanceolate), *Willd. Sp. Pl.* v. *p.* 274. Athyrium, *Roth.*—Var. *refractum*; larger pinnæ broad pinnatifid very crowded, stipes and rachis beneath castaneous; apparently a cultivated form, and only known in that state. Aspl. refractum, *Moore, Br. Ferns, Nat. Print. sub t.* 35 *A. Lowe, Nat. Hist. of Ferns,* v. *t.* 35 *A.*

Hab. Central Europe: France, Italy, Spain, Germany, etc.; rare in Britain.—A small, but beautiful and well-marked species, with very finely cut pinnæ and pinnules: the lower pinnæ dwarfed and remote, the rest approximate, and often very compact.

183. A. (Euasplenium) *tenuifolium*, Don; caudex horizontal stout when old scarcely paleaceous, stipites tufted 3–4 inches to a span long castaneous at the base, fronds oblong-ovate acuminate pale green membranaceous 6–12 inches long 3-subquadripinnate, pinnæ and pinnules all petiolate, primary pinnæ patent 2–3 inches long broad-lanceolate ultimate pinnules obovato- or linear-cuneate tapering into the petiole bifid or pinnatifid or laciniated, the segments very acute almost mucronate, apices of the fronds and primary pinnæ pinnatifid with linear segments, veins solitary central terminating much short of the apices, sori rarely more than 2

on the disc or pinnule oblong generally on a forked nerve and the membranous involucres open towards each other.—*Don, Prodr. Fl. Nep. p.* 8. *Kze. in Linnæa*, xxiv. *p.* 265. *Metten. Asplen. p.* 128. *Hook. 2nd Cent. of Ferns, t.* 29. Aspl. concinnum, *Wall. Cat. n.* 216.

Hab. India; Nepal, *Wallich.* Neilgherries, *Sir F. Adam, Wight, Herb. Propr. n.* 104, *Gardner, Schmid.* Sikkim-Himalaya, *Hook. fil. and Thomson.* Myrung and Mishmee, and Khasya, *Griffith.* Ceylon, *Gardner, n.* 1079, *Thwaites* (elev. 7000 feet), *n.* 3628.—An elegant, very compound species, allied to *A. cicutarium*, yet very distinct, especially in the very acute apices of the segments of the pinnules, and in the involucres of the sori never opening at or near the margin.

184. A. (Euasplenium) *Hookerianum*, Colens.; lax flexuose, caudex a short oblong fibrous-rooting rhizome paleaceous at the summit with subulate scales, stipites tufted 1–3 or 4 inches long pale brown deciduously setoso-squamose, frond 2–8 inches long oblong and pinnate or ovate and bipinnate submembranaceous, pinnæ 1–2 inches long-petioled, pinnules also long-petiolulate rhombeo-subrotund 2–4 lines long sublobate and dentate rarely again subpinnate or pinnatifid, veins subflabellate dichotomous, sori 3–5 oblong on the disc of the pinnules, involucre membranaceous, rachis and petioles very slender.—*Colens. in Tasm. Journ. of Nat. Science*, ii. *p.* 169. *Moore, Ind. Fil. p.* 136 (*excl. syn.* A. Colensoi). Aspl. adiantoides, *Raoul, Ann. Sc. Nat.* v. *p.* 115, 1844, *and Choix des Pl. N. Zél. p.* 10. *t.* 1 (*not Raddi*). A. adiantoides, *var.* minus, *Hook. fil. in Ic. Plant. t.* 983; *var.* Hookerianum, *Hook. fil. Fl. N. Zeal.* ii. *p.* 35 (excl. syn. *A. Colensoi*). A. Raouli, *var.* minus, *Metten. Asplen. p.* 118.

Hab. Northern and Middle Islands of New Zealand, *A. Cunningham, Colenso, Hook. fil., Ralph.* Banks's Peninsula, *Raoul, Dr. Lyall.*—Three supposed states of this species are described by Dr. Hooker in the 'Icones Plantarum,' under the name of *A. adiantoides* of Raoul: 1, var. *minus*, the original *adiantoides* of that author; 2, var. *Richardi*; and 3, var. *Colensoi*; all natives of New Zealand. I am disposed to retain the present as a good species, under the name given to it by its first describer. The two others, I think, may be united as one species under Dr. Hooker's name of *A. Richardi* (see our *n.* 188).

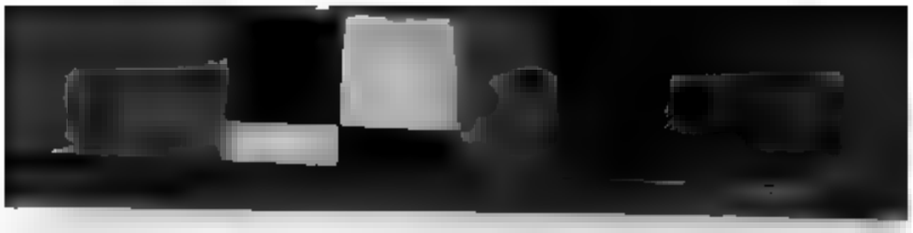
185. A. (Euasplenium) *repens*, Hook.; very small, caudex long filiform creeping upon the trees and bushes patent sparsely hirsuto-tomentose, fronds numerous sparse membranaceous tender yet subsucculent green very shortly petiolate (petioles 1–2 lines extremely slender) 1–2 inches long ovato-lanceolate bi- rarely subtripinnate, pinnæ 2 lines long petioled, pinnules divaricato-patent about a line long palmato-cuneate tapering into a petiole subdigitato-laciniate

at the apex, segments often bipartite or bifid unequal subsetaceo-acuminate often incurved, veins thick immersed single or once forked in the bilobed or bipartite pinnules, sori oblong solitary upon the inside of one of the branches of the fork opening towards the opposite one (never towards the margin), involucres membranaceous brown, rachis as well as the stipes herbaceous.—*Hook. 2nd Cent. of Ferns, t.* 32.

Hab. Ecuador, growing on trees and shrubs in the forests of Archedona, Quitinian Andes, *Jameson, n.* 786.—One of the most distinct of all *Asplenia:* the caudices of our specimens are a foot and more long, with numerous minute, nearly sessile fronds, scarcely two inches long, with patenti-divaricated pinnules of a very peculiar shape, rather broad, cuneate, often bifid or bipartite, the otherwise truncated apices cut into unequal, broad, subulate, and almost cuspidate segments, which are more or less incurved. The veins are unusually thick for so minute a plant, generally forked, one branch bearing a sorus which opens towards the centre or opposite branch, never approaching the margin, as in the *Dareastrum*-section.

186. A. (Euasplenium) *Monteverdense*, Hook.; caudex a small knot copiously fibroso-radicose, stipites cæspitose 1–2 inches long lurid-castaneous subflexuose, fronds 4 to 6 inches or rather more long broad-lanceolate tapering at the base membranaceous when young and pale green firm and subcoriaceous dark green in age tripinnate, pinnæ all petiolate primary ones patent 1–1½ inches long oblong-ovate obtuse secondary ones broad cuneate lowest ones only again pinnated with three or four petiolated pinnules which are also cuneate rarely entire generally bifid with the segments short acute and often a little incurved (towards each other or subscorpioid) or trifid with the segments short unequal, all very acute uppermost ones quite entire oblong or obovate confluent, veins solitary central, forking as the pinnules divide clubbed at the apex, sori solitary on a lobe or on an undivided pinnule subdareoid at first small at length enlarging and becoming a convex oval mass of capsules occupying nearly the entire lobe or pinnule and quite concealing the small linear-oblong yellowish-green very membranaceous involucres, rachises all green slender compressed scarcely margined.—*Hook. in 2nd Cent. of Ferns, t.* 41.

Hab. Under overhanging rocks near Mount Verde, on the eastern side of Cuba, 1859, *C. Wright, n.* 1029.—Difficult as are Ferns in general, especially where the species are numerous, as in the genus now under consideration, to be described in words, those I think are the most so which are very compound, and have rather narrow pinnules or segments, with only a solitary nerve, and many of which may be almost as correctly said to be divided in a pinnatifid as pinnated manner, and which are more or less allied to the *Dareæ*-group. If I fail in my



character of the present very distinct species, the figure above referred to will show its true characters. Its nearest affinity is perhaps with *C. varians*, but the short stipites, the fronds tapering downwards in circumscription, and the different forms of the pinnæ and their much longer petioles, will readily distinguish it. The beautiful tufts of specimens sent by Mr. Wright exhibit the old fertile fronds always accompanied by younger ones in different stages of perfection and of fructification; without the latter, the plant might be taken for a *Gymnogramme*, if only the old fertile fronds are seen, for the comparatively large and oval-shaped sori overwhelm and entirely conceal the small, delicate, membranaceous involucre.

(Dareastrum.—*Type* A. bulbiferum, *Forst. An ill-defined group, of compoundly pinnate species, in part partaking of the following* Darea-*group, in the frequently narrow segments and marginal or submarginal sori, but often having, even on the same species, some sori marginal, others on the disc.* Asplenium, § Dareastrum, *in part, Fée, Gen. p.* 187.)

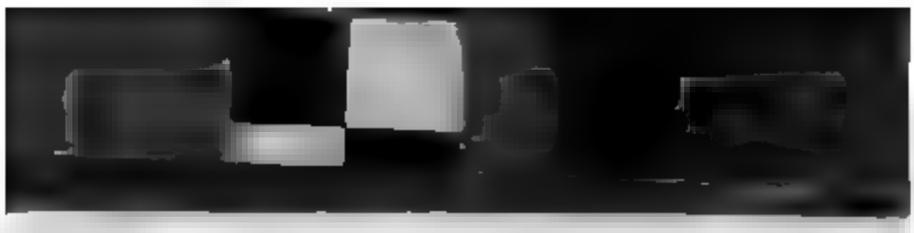
187. A. (Euasplenium) ***bulbiferum***, Forst.; caudex stout horizontal or oblique paleaceous with long linear-subulate scales at the summit, stipites lurid-green 4 inches to a foot long sometimes deciduously and sparsely paleaceous semiterete or broad and compressed, fronds subcoriaceo-membranaceous yet flaccid 1–3 feet long ovato-lanceolate erect or pendulous dark green pinnato-pinnatifid with lobes entire or toothed or usually bi- rarely tripinnate, primary pinnæ often proliferous 6 inches long petiolate more or less lanceolate acuminated, pinnules in the normal form from ½ an inch to 2 inches long elliptical-ovate and more or less pinnatifid with euasplenioid sori, or the pinnules are narrower elongated deeply divided, and the majority of them quite dareoid, sori oblique, involucres firm greenish, rachises compressed.—(Normal form, but gradually passing into the next, *laxum*), *Forst. Prodr. p.* 80. *Sw. Syn. Fil. pp.* 83 *and* 278. *Schk. Fil. t.* 79. *Hook. Ic. Pl. t.* 423. *Hombr. et Jacq. Voy. Pól. Sud, Bot. t.* 3. *f.* I. *Hook. fil. Fl. N. Zeal.* ii. *p.* 34. *Fl. Tasm.* ii. *p.* 146. *Metten. Asplen. p.* 106. *Moore, Ind. Fil. p.* 118. Cænopteris, *Desv.* Aspl. viridans, *Labill. Sert. Aust. Caled.* i. *p.* 2. *t.* 2. *Metten. Asplen. p.* 107. A. bullatum, *Wall. Cat. n.* 215. Athyrium macrocarpum, *Fée, Gen. Fil. p.* 188. Asplen., *Moore.*—Var. *laxum*; fronds generally pendulous, pinnules more deeply divided into narrow dareoid segments. *Hook. fil. Fl. N. Zeal.* ii. *p.* 34. Cænopteris appendiculata, *Labill. Fl. Nov. Holl.* ii. *p.* 24. *t.* 243. A. laxum, *Br. Prodr. Fl. Nov. Holl. p.* 151. *Hombr. et Jacq. Voy. Pól. Sud, t.* 3. *f.* J. A. triste?, *Raoul, Choix des Pl. N. Zél. p.* 10.—Var. *tripinnatum*; fronds tripinnate, pinnules

and segments narrow, resembling some states of *A. flaccidum*, but too compound and too membranaceous. *Hook. fil. Fl. N. Zeal. l. c.* A. Fabianum, *Moore, Ind. Fil. p.* 128.

Hab. New Zealand, all the islands, and Tasmania, *Labillardière, Gunn, n.* 25 *and* 1529, etc.: all the varieties. Austro-Caledonia, *Labillardière.*—Var. *bipinnatum*. New Zealand, *Hook. fil.* Akaroa, *Raoul.* South Australia; Victoria, Dandenong, *F. Mueller* (partially tripinnate). Northern India: Nepal, *Wallich.* Sikkim, *Hook. fil. and Thomson.* Bhotan, *Griffith, n.* 2804 (ordinary form, but bipinnate). Penang, *Hance* (common form, and var. *laxum*). South America, Guatemala, *Skinner* (ordinary form and var. *laxum*, dareoid, stipes and rachis villoso-squamose). Mexico, Oaxaca, elev. 5000 feet, rariss., *Galeotti, n.* 6555 (ordinary form, but with the lobes and teeth of the segments of the pinnules very acute) (*Athyrium macrocarpum*, Fée).—A very polymorphous species, and as Dr. Hooker, who is familiar with it in its head-quarters of New Zealand and Tasmania, says, "It is quite in vain to attempt to limit this and its allied species (*A. flaccidum*) by words." I do not, however, share with that author in the opinion of its too close proximity to *A. flaccidum*; still less that it passes into *A. adiantoides*, Raoul (*A. Hookerianum* of this work): at least, my own specimens do not lead me to such conclusions. The *Aspl. viridans* of Austro-Caledonia may, I think, be safely united to this. It will surprise many that I bring under this species the *Aspl. bullatum* of Wallich, Cat. n. 215; and still more, perhaps, that I refer here what I consider the same species from tropical regions of the New World: the differences are too trifling to justify me in keeping them distinct.

188. A. (Euasplenium) *Richardi*, Hook. fil.; erect rigid, caudex short thick knotted paleaceous with subulate scales as are the tufted erect rather stout stipites 4–6 inches long, fronds 3–5 inches long ovate subcoriaceo-membranaceous acuminated rather rigid bipinnate, primary pinnæ petiolate 1 inch to an inch and a half long lanceolate approximate, pinnules sessile or nearly so crowded ovate or obovate 2–3 lines long deeply pinnatifid with oblong obtuse segments, superior ones confluent with coarsely serrated segments, veins forked one to each segment terminating below the apex and clavate, sori solitary upon the segments broad-oblong, involucre membranaceous opening just within the margin, rachis moderately stout and straight.—*Hook. fil. Fl. N. Zeal.* ii. *p.* 35. *Moore, Ind. Fil. p.* 162. Aspl. adiantoides, *var.* Richardi, *Hook. fil. in Ic. Pl. t.* 977. A. Raouli, *var.* Richardi, *Metten. Asplen. p.* 118.—*β Colensoi;* fronds greener more flaccid, pinnules more or less petiolate more deeply and finely pinnatifid. A. Colensoi, *Hook. fil. in Lond. Journ. of Bot.* iii. *p.* 26. *Colenso, in Tasm. Phil. Journ.* ii. *p.* 170. A. adiantoides, *var.* Colensoi, *Hook. fil. in Ic. Plant. t.* 984. A. Hookerianum, *var.* Colensoi, *Moore, Ind. Fil. p.* 137.

Hab. New River, Southern Island of New Zealand, *ex Herb. A. Richard.*—*β Colensoi.* New Zealand, Middle Island, *Colenso.* Port Nicholson, *Dr. Lyall.*



—If, as I believe, the *A. Richardi* should be kept distinct from *Aspl. adiantoides* of Raoul, I think *A. Colensoi* of Hook. fil (*olim*) will better rank with it than with the latter (*A. Hookerianum*, Col., our *n.* 194), and, rather with the *Darea-strum*-group of the genus, than with our previous group of *Composita variæ*. Not that much stress should be laid on this circumstance, for we see it often occur that the character of the two groups are found in the same species. Under this species in Ic. Plant. t 977, Dr. Hooker has well remarked that "as materials increase in our collections, so do the difficulties of discriminating the species increase." Our var. β is not far removed from some states of *A. cicutarium*: but this latter is a much more delicate and elegant plant.

189. A. (Euasplenium) *cicutarium*, Sw.; caudex stout erect scaly above, stipites tufted 3–4 inches to a span and more high livid-green sometimes marginato-alate fronds 6–8 inches to a foot and a half long firm-membranaceous bright-green broad ovato-lanceolate bipinnate, pinnæ horizontal subsessile from a rather broad truncated base oblong-lanceolate more or less acuminate 2–3 inches long, pinnæ shortly petiolate about ¼ an inch long ovate obtuse pinnatifid with 8–10 linear acute bi-tridentate or entire segments superior basal segment auriculiform and often distinct cuneate subpinnatifid, lowest pairs of the pinnæ reflexed upon the main rachis and cristate those of the apex linear entire confluent quite dareoid, veins pinnated one to each segment, sori on the disc of the larger pinnules in two rows oblong often small, those on the terminal narrow segments solitary quite marginal, involucres pale membranaceous, rachises general and partial more or less winged.—*Sw. Prodr. p.* 130 (*excl. syn.*). *Hook. Gen. Fil. t.* 6 (*not satisfactory*). *Metten. Fil. Hort. Lips. p.* 71. *t.* 13. *f.* 3–9. *Lowe, Nat. Hist. of Ferns*, v. *t.* 20. *Metten. Asplen. p.* 116. *Moore, Ind. Fil. p.* 119. Cænopteris, *Thunb., Sw., etc.* Darea, *Sm. Willd. Sp. Pl.* v. *p.* 300. D. membranacea, *Poir.* Aspl. cristatum, *Lam.* Athyrium Hænkeanum, *Pr.* Filix pinnulis cristatis, *Plum. Fil. p.* 34. *t.* 48 *A.*—Var. *dissectum*; pinnules deeply divided so that the segments are nearly all monosorous and dareoid, fronds generally dark green tapering down upon the stipes the pinnæ being there dwarfed. Aspl. dissectum, *Link.*

Hab. Tropical America; West Indies, *Plumier, Swartz, etc.* Jamaica, abundant, *Wilson, Alexander, Prior, Purdie, Hartweg, n.* 11,520. Cuba, *C. Wright, n.* 855. Portorico, *Schwanecke* (A confusum, *Kze. Herb.*). Tropical America: Mexico, *Jurgensen, n.* 733; *Galeotti, n.* 6298 *and* 6502. Venezuela, *Moritz, n.* 211; *Fendler, n.* 124 β (rachises and stipes winged, large, 2 feet long, pinnules deeply pinnatifid, so that all the segments are dareoid), and *n* 43 (A. dissectum, *Lk., fide Kl*), *Fendler, n.* 124. New Granada, Ocaña, 7000 feet elev., *Schlim, n.* 614 and *n.* 67 (very large, pinnules all deeply cut and dareoid), *Linden, n.* 1487. Brazil, *Sellow.* Pacific, South America, Bay San Francisco, Solano, *Capt. Wood*

(segments all dareoid). Boqueta, Veraguas, and Isle of Gorgona, *Seemann*, 1554. Tarapota, Eastern Peru, *Spruce*, *n.* 3975. Forest of Archedona, Ecuador, *Jameson* (all dareoid). Galapagos, *Capt. Wood*. Macalisberg, S. E. Africa, *Sanderson* (*in Herb. Nostr.*) (more lax, ultimate pinnules more cuneate and more distant, sori very small).—The ordinary form of this delicate and elegant species, almost entirely confined to the New World, which has ovate pinnatifid (not deeply) pinnules, with sori not marginal, but on the disc, is distinct enough; but, unfortunately, there are copious specimens where the pinnules are so deeply divided, and into such narrow segments, that there is not room for more than one sorus, and these have generally the fronds much contracted below, or rather that part is formed of numerous dwarfed multifid pinnæ, extending almost to the base of the stipes in some cases: and there seem to be all intermediate grades. None of the individuals here brought under *A. cicutarium* are radicant at the apex, and this may afford a character to maintain this species distinct from *A. rhizophyllum*, Kze., and its allies. I cannot but feel a little doubtful about my Macalisberg plant, which has the pinnules more dissected than in the common form of *A. cicutarium*, but the sori are very small, and always distant from the margin. Mr. Moore has marked it as near *A. myriophyllum*: itself a very dubious species.

190. A. (Euasplenium) *Gibertianum*, Hook.; caudex short thick descending densely fibrous clothed with subulate scales at the summit, stipites tufted numerous from the crown of the caudex 1½ inch or a little more long green at length castaneous chiefly at the back slightly scaly below winged above, fronds 6 inches long membranaceous bright green lanceolate pinnated, pinnæ numerous approximate ¾ of an inch long ovato-lanceolate obliquely cuneate at the base and decurrent so as to form a wing to the rachis extending to the insertion of the pinna next below, deeply pinnatifid, segments oblong lanceolate very acute entire, inferior ones subcuneate bi-trifid, the lower sinuses deeper and extending nearer to the costa, veins simple or in the lower segments once or twice forked, sori solitary near the base of each segment occupying as it were the disc of the pinna neither extending to the rachis nor the margin scarcely above the sinus, involucres membranaceous almost white, rachis green much compressed winged on both sides with the decurrent bases of the pinnules at the apex frequently extended some length beyond the pinnæ and proliferous.—*Hook. 2nd Cent. of Ferns, t.* 22. A. inciso-alatum, *Moore, MS. in Hook. Herb. and in Index Fil. p.* 137 (*name only*).

Hab. Assumption, State of Paraguay, 650 miles above Buenos Ayres, *M. Gibert*, to whom I desire to dedicate the species (not from the "Island of Assumption," as stated by Mr. Moore).—A beautiful species, yet I sometimes fear too nearly allied to *Aspl. cicutarium*, a very variable plant. Its distinguishing characters may be looked for in the pinnatifid rather pinnated pinnæ, the very acute segments, the sori all distant from the margin, the broad winged rachis, often prolonged and proliferous at the apex.

191. A. (Euasplenium) *strictum*, Brack.; caudex short thick erect, stipites 2–4 inches long lurid-green tufted, fronds 6–12 inches and more long membranaceous oblong-lanceolate tapering much below bipinnate, primary pinnæ 1–1½ inch long rather distant horizontal shortly petiolate lanceolate or from a broad cuneato-rhomboidal base lanceolate deeply pinnatifid or generally again pinnate in the lower half, pinnules or lobes all cuneate superior basal ones the largest 3–4-lobed the rest bi-trifid or retuse at their truncated apex, uppermost lobes entire rarely subfalcate obtuse, veins forked subflabellate in the broader lobes or pinnæ, sori rather small linear-oblong 2–6 on the disc of the pinnules and these sometimes diplazioid and on the narrow terminal ones quite dareoid situated at the margin, involucres membranaceous brown, rachis very obscurely winged straight or subflexuose. —*Brack. Fil. U. S. Expl. Exp. p.* 168. *t.* 23. *f.* 1. *Metten. Asplen. p.* 115. Aspl. patens, *Hook. et Arn. Bot. Beech. Voy. p.* 106 (*not p.* 274, *from Bonin, which is a var. of* A. laserpitiifolium).

Hab. Sandwich Islands; Oahu, *Douglas, Nuttall.* Kauai, on open mountain ridges, *Brackenridge.* Owhyhee, *Nuttall* (A. multifidum, *Nutt. MS.*). A species which Dr. Arnott and I had taken for the *A. patens* of Kaulfuss. Brackenridge alludes to its affinity with *A. rhizophyllum*, Sm., and it is, perhaps, too near that species, especially that form of it which has been called *A. Macræi*, Hook. and Grev., from the Sandwich Islands.

192. A. (Euasplenium) *rhizophyllum*, Kze.; caudex rather stout ascendant or erect paleaceous at the summit with black subulate scales, stipites 2–6 inches long tufted brown marginato-alate as well as the rachis, fronds 6–12 inches long broad-lanceolate acuminated membranaceous attenuated below (with distant small pinnæ) dark green pinnato-pinnatifid or bi-tripinnate, primary pinnæ an inch long horizontal deeply almost to the rachis pinnatifid or again pinnated in the lower half, the upper half pinnatifid with linear monosorous segments straight or curved rarely bifid, lower segments or pinnules larger more cuneate and broader the lowest one at the superior base largest and auriculiform bi-trisorous sometimes deeply pinnatifid with linear segments (var. *myriophyllum*), veins solitary in each segment, sori 2–3 in the disc of the larger basal pinnules quite dareoid in the narrow segments, involucres pale membranaceous, "rachis elongated and rooting at the apex."—(Normal and more simple form), *Kze. in Linnæa*, ix. *p.* 71 (*not Linn.*). *Pr. Tent. Pterid.*

p. 108. *Metten. Asplen. p.* 115 (*excl. syn. Dict. Sc. Nat., which is* Camptosorus rhizophyllus). *Moore, Ind. Fil. p.* 162. Cænopteris, *Th. Sm. Ic. ined. t.* 50. *Sw. Fl. Ind. Occ.* iii. *p.* 1624. *Syn. Fil. p.* 88. *Hook. et Grev. Ic. Fil. p.* 193. Darea, *Sm. Mem. Act. Taur.* v. *p.* 409. *Willd. Sp. Pl.* v. *p.* 300. *Fée.* Ruta-muraria accedens, etc., *Sloan. Jam.* i. *p.* 92. *t.* 52. *f.* 3. A. Macræi, *Hook. et Grev. Ic. Fil. t.* 217. *Brack. U. S. Expl. Exp. p.* 159.—Var. *myriophyllum;* more compound, fronds bi-tripinnate, lower pinnules of the primary pinnæ deeply lobato-pinnatifid or somewhat again pinnated the rest more or less obovato-cuneate and more or less bifid or trifid, sori dareoid. Aspl. rhizophyllum, *var., Metten. Asplen. p.* 116. A. myriophyllum, *Pr. Rel. Hænk.* i. *p.* 48. *Moore, Ind. Fil. p.* 147 (*excl. var.* β divaricatum). Cænopteris myriophylla, *Sw. Fl. Ind. Occ.* iii. *p.* 1626. *Syn. Fil. p.* 88. A. bifissum, *Fée, Gen. p.* 199 (*segments very narrow*). Darea tripinnata, *Cav.?* Aspl. Anchiritæ, A. pusillum, *and* A. verecundum, *Chapman's MS. in Herb. Nostr.*

Hab. Tropical America. Jamaica, *Sloane, Swartz, Wiles, Bancroft.* Dominica, *Thierry.* Central America, *Barclay, Cuming,* n. 1246. New Granada, *Purdie.* Galapagos, *Capt. Wood.* Cocos Island, *Hinds.* Sandwich Islands, *M'Rae.*—Var. *myriophyllum.* Probably in the same localities of tropical America and the West Indies as the normal state. Jamaica, *Wiles, M'Fadyen, Dr. Alexander Prior.* Trinidad, *Sir Ralph Woodford.* Cuba, *C. Wright,* n. 856; *Linden,* n. 1888 (A. bifissum, *Fée*). Portorico, *Schwanecke.* New Granada, Sierra Nevada, *Schlim, with* n. 841, n. 849, elev. 7000 feet, n. 824. Venezuela, *Funck and Schlim,* n. 539 *and* 833. Mexico, *Linden,* n. 1548; *Galeotti,* n. 4250 (with proliferous apex). Tarapota, Eastern Peru, *C. W. Wilson* (*Spruce,* n. 4782). Andes of Peru, *Mathews,* n. 1799; *M'Lean.* Andes of Quito, Forest of Archedona, *Jameson,* n. 28. United States; shady limestone cliffs, Middle Florida, *Dr. A. W. Chapman.* Caves, West Florida (from *Dr. Asa Gray*—probably the same locality as the preceding); Milwaukee, Wisconsin, *J. A. Lapham* (those from the United States in my herbarium are truly bipinnate, but the pinnules are less divided than in the more tropical specimens).—Sir James Smith figures and describes this plant, (and he is the first authority,) with a prolonged, naked, proliferous apex (whence the specific name), with most of the pinnæ or segments linear, entire, the basal ones only broader and lobed. Our figures above quoted agree with this in all respects save the proliferous or radicant apex, nor do any of our specimens possess this character. Many of them, indeed, have several of the pinnæ more or less lobed, but they have never the broad, regularly pinnatifid pinnules characteristic of the norma form of its near ally, *A. cicutarium,* (our n. 189). Most of our specimens of *A. rhizophyllum* are rather pinnatifid than pinnated: but then some gradually pass into the form long described as *Aspl.* (or *Cænopteris* or *Darea*) *myriophyllum.* This, Mettenius, I think judiciously, unites with *A. rhizophyllum,* while Moore maintains it as distinct, and unites with it *A. divaricatum* of Kunze. The var. *myriophyllum* is, however, in all my numerous specimens, as destitute of the rooting character at the apex, as are all my specimens of true *rhizophyllum.* My fear is, I may have included some, among my deeply cut varieties, of *A. cicutarium,* especially those with the dwarfed lower pinnæ of the frond: they seem to be almost a connecting link between the two species.

193. A. (Euasplenium) *Hallii*, Hook.; caudex stout ascending, stipites tufted ebeneous glossy 1–2 inches high, fronds 6–12 inches long submembranaceous dark brown oblong or lanceolate tapering at the base generally terminating above in a long nearly leafless rooting (?) extremity of the rachis bipinnate or pinnato-pinnatifid, primary pinnæ sessile ovato-lanceolate obtuse ¼ of an inch to an inch long horizontal either all pinnatifid with the segments spreading linear obtuse the one at the superior base (auricle) larger and bifid, or the base of the pinnæ is again pinnate, the rest pinnatifid, lowest pinna of the frond quite dwarfed, veins pinnated one to each segment, sori rather short oblong, one to each segment in the fertile pinnæ and nearer the disc of the pinnæ than the margin, involucres pale brown membranaceous, rachis ebeneous.—*Hook. 2nd Cent. of Ferns, t.* 30. Aspl. pectinatum, *Moore, MS. in Herb. Hook. and Ind. Fil.* (*name only; not of Wallich nor Mettenius*).

Hab Forest of Esmeraldas, Ecuador, *Col. Hall* São Gabriel, valley of the Amazon, on young trees and shrubs: "fronds spreading horizontally" (no doubt rooting at the extremity), *Spruce, n.* 2357.—The above are the only localities known of this plant. My specimens from Col. Hall have the pinnæ again pinnated, especially in their lower half those of Mr. Spruce are only deeply pinnatifid, but the plants are clearly specifically identical. It is very distinct from any known *Asplenium*; remarkable for the very short ebeneous stipes, the lower and dwarfed pinnæ extending almost to the caudex. In the flagelliform and radicant apex it resembles *A. rhizophyllum*, but the pinnæ and pinnules are widely different In some respects it has an affinity with *A. rhizophorum*, L., especially the Venezuela specimen of Fendler, n 434; but there the base of the frond is abrupt, not tapering downward in consequence of the gradually diminishing pinnæ, and even in the least compound state the general habit of the plant induces me rather to place it in the *Darea* section or group than the *Salicifolium*.

194. A. (Euasplenium) *triphyllum*, Pr.; caudex in age stout an inch or more long erect or declined copiously clothed with the remains of former years' stipites, stipites tufted 1–6 inches long glossy brown, fronds 2 inches to a foot and more long bi- rarely tripinnate, pinnæ distant close and subimbricated more or less membranaceous short subovate, pinnules few 3–5 or more small from half to a line long sessile or petiolulate cuneate or obovato-cuneate emarginate or bifid, lowest ones again pinnated with 1–3 subpetiolated pinnules, veins simple or forked in the bifid pinnæ terminating much below the apex, sori 1–2 rarely more on the disc of the pinnule (except in the very narrow ones) distant from the margin short-oblong, involucre broad almost semioval pale membranace-

ous, rachis not unfrequently gemmiferous at its side.—Var. *a. tenuifrons;* pinnules 3–4. *Pr. Rel. Hænk.* i. *p.* 45. *Hook. et Grev. Ic. Fil. t.* 88. *Brack. Fil. U. St. Expl. Exp. p.* 159. *Metten. Asplen. p.* 125. A. herbaceum, *Fée, 8me Mém. Foug. p.* 55. *t.* 22. *f.* 3 (*according to the specimen referred to of Schlim*), *pinnules* 3–5.—Var. *β. majus;* larger subcoriaceous, pinnules more numerous. Aspl. imbricatum, *Hook. et Grev. Ic. Fil. t.* 165. *Brack. Fil. U. S. Expl. Exp. p.* 159. *Metten. Asplen. p.* 125. *Moore, Ind. Fil. p.* 137. A. ternatum, *Pr. Rel. Hænk.* i. *p.* 45. *Fée, 7me Mém. p.* 54. *t.* 16. *f.* 4 (*according to the specimen referred to of Schlim*). A. sessilifolium, *Desv.*—Var. *γ. compactum;* small, pinnæ and pinnules subcoriaceous densely compacted firm and coriaceous (apparently very alpine).

Hab. Var. *a.* Cordillera of Peru, *Hænke.* Cerro Pasco and Huamantanga, *Matthews*, *n.* 606 and 966. Valley of Canta, *Cruckshanks.* Ecuador, Quitinian Andes, elev. 15,000 feet, *Jameson.*—Var. *β.* Pichinca, *Jameson*, same elev. New Granada, elev. 10–1100 feet, *Schlim*, *n.* 327.—Var. *γ.* Andes of Peru, apparently from a great elevation, *M'Lean.* Chimborazo and Antisana, Ecuador, 13,000 and 14,000 feet elev., *Jameson.*—Since the first discovery, and the publication by Presl, of the *Aspl. triphyllum*, our herbarium has been enriched with specimens which compel me to unite other supposed species with it: and I am far from certain that other synonyms may not yet have to be added. I have already observed that some of our small compact specimens (here called *var.* γ), have a great affinity with *A. divaricatum* of Kunze; and that Moore unites it, I fear correctly enough, with *A. myriophyllum*, itself a very variable species: and I feel exceedingly doubtful about the *A. cladolepton*, Fée, 8me Mém. Foug. t. 22. f. 4, which has quite the aspect of a large form of *A. triphyllum*, with more numerous pinnæ than usual; but my specimens of Schlim, to which he refers, are quite the *A. myriophyllum* of Sw. (*Cænopteris*), and this, as well as *A. cladolepton*, Mettenius refers to *A. rhizophyllum*, while Moore maintains *cladolepton* as distinct.

195. A. (Euasplenium) *rutaceum*, Metten.; caudex stout oblique densely rooting, stipites tufted ½ an inch to 2 inches long castaneous as is the rather strict main rachis which is prolonged beyond the frond rooting and proliferous at the apex, fronds dark green membranaceous 10–12 inches long broad-lanceolate acuminated attenuated at the base in consequence of the dwarfed lower pinnæ bi-tripinnate, primary pinnæ 1–1½ inch long numerous approximate from a broad nearly sessile base oblong obtuse, secondary pinnæ 2 lines long all petiolate pinnated with 2–3 obovato-spathulate rarely acute pinnæ entire or 2-lobed tapering into a very distinct petiole, lowest pair most compound and rather larger often reflexed upon the rachis, ultimate pinnules on the primary pinnæ upon the frond entire or 2-lobed the lobes roundish,

veins single scarcely extending beyond the middle of the pinnule, sorus short oblong or oval on the disc distant from the margin, involucre membranaceous pale.—*Metten. Asplen. p.* 129. *t.* 5. *f.* 32, 33. *Moore, Ind. Fil. p.* 162. Aspidium rutaceum, *Willd. Sp. Pl.* v. *p.* 266. Athyrium, *Pr. Hook. 2nd Cent. of Ferns, t.* 34. Lonchitis in auriculas subrotundas divisa, *Plum. Fil. p.* 44. *t.* 57.

Hab. St. Domingo, *Plumier* Columbia; Tovar, *Moritz*, n. 402 (*Herb. Nostr.*). New Granada, Ocaña, *Schlim*, n. 624; and Sierra Nevada, elev 6000 feet Venezuela, *Fendler*, n 123 On trunks of trees, forests of Archedona, Andes of Quito, *Jameson*, n. 788 Plumier's figure is a very rude, yet a tolerably faithful representation of this plant, but he does not appear to have seen the elongated naked rachis, which indicates its affinity with *A rhizophyllum*, and exists in nearly all my specimens Indeed, two of the numbered specimens above alluded to of Schlim, and of three other collectors—but which I consider true *A rutaceum* are brought under his *A myriophyllum* (*A rhizophyllum*, var *nobis*) Its distinctive character rests upon the broad-spathulate, long-petiolulate pinnules, and these are arranged with singular regularity and at equal distances All my specimens have the same character, and they are identical with an authentic specimen from Mettenius, who is the only author that has given a description from the plant itself. Willdenow's character is evidently from Plumier's figure, and the short sori represented gave Willdenow reason to guess the Fern was an "*Aspidium*."

196. A. (Euasplenium) *divaricatum*, Kze.; "frond very thin and membranaceous glabrous bright green oblong or lanceolate flexuose acuminate bi- or tripinnate the apex simply pinnated, pinnæ subsessile decurrent approximate patenti-divergent oblong rather obtuse, primary pinnules petiolate trapezio-ovate obtuse, ultimate ones subquinate from a cuneate base linear-oblong rather obtuse sterile ones narrow, fertile broader obliquely ovate monosorous, sori and involucres membranaceous short-oblong large, primary rachis brown with a green margin, secondary ones winged green, stipes very short (not always) angled ferruginous minutely paleaceous, rhizome stout horizontal fusco-paleaceous at the apex radicose with rufo-pilose fibres." *Kze. Syn. Fil. Pœpp. in Linnæa*, ix. *p.* 71. *Schk. Fil. Suppl.* ii. *p.* 94. *t.* 139 (*excellent*). *Metten. Asplen. p.* 115. *t.* 5. *f.* 7, 8 (*pinnules only, not satisfactory*). A. myriophyllum, β divaricatum, *Moore, Ind. Fil. p.* 148 (*excl. all the localities from my herbarium, save those of Peru and S. Chili*).

Hab. Andes of Peru, *Pœppig* (*in Herb. Nostr.*), *M'Lean*, n. 1800 (*common form*). South Chili, *Wm Lobb* (*Herb. Nostr.*).—One of the most finely cut and most delicate of Ferns, very local, I believe; quite Andine in Peru, descending to much lower elevations in Chili; well represented and described by Kunze. Its peculiarity consists in the fertile obovate lobe (so broad that the sorus is never

marginal) being accompanied by a linear, narrow, falcate, sterile one, resembling a bractea, as well shown in Kunze's figure, and, though less intelligibly, by Mettenius.

(Darea-*group.*—*Type* Aspl. rutæfolium. *Sori generally solitary upon a segment, and quite marginal: from this position of the sori, and the frequently firm texture of the involucres, some species approach the genus* Davallia. *Fronds bipinnate, or from the confluent bases of the pinnæ bi-tripinnatifid. Segments narrow; veins solitary, and central in each segment, with few exceptions.* Darea, *Juss.* Cænopteris, *Berg.*)

197. A. (Euasplenium) *flaccidum*, Forst.; caudex stout erect crowned with copious large sphagnoid dark-coloured lanceolato-subulate membranaceous scales, stipites tufted short 3–6 inches long compresso-triquetrous (when recent), fronds very polymorphous from 6 inches to 3 feet long sub-erect or pendulous subcoriaceous generally whitish-green (when dry) sublanceolate acuminate pinnate or bipinnate in what may be considered the normal form, and as in the plants cultivated at Kew, with the primary pinnæ 4–5 inches to a span long pendently patent lanceolate finely acuminate rather distant, below pinnate the lowest superior pinnule the largest lanceolate petiolate pinnatifid 2 inches long then proceeding upwards they become less pinnatifid simply forked and the rest of the pinna is only pinnatifid all the segments erecto-patent slightly incurved linear-oblong a little tapering obtuse about ½ an inch long all soriferous, when forked each branch bears a sorus opposite to the other, a single vein occupies each segment, sori wholly on the segment and at the very margin, involucres oblong firm (almost the texture of the frond), main rachis stout channeled above margined, secondary winged by the decurrent bases of the pinnules and segments;—from this form the varieties are almost endless, simply pinnate with the pinnæ 6 inches long linear acuminate quite entire at the margin or more or less remote serrate and even on the same specimen, generally on the upper portion; when the pinnæ are broad-lanceolate and not deeply pinnatifid the sori are arranged entirely on the disc quite below the sinus, or they may extend partially into the margin of the segment.—*Forst. Prodr. n.* 426. *Hook. fil. Fl. N. Zeal.* ii. *p.* 35. *Fl. Tasm.* ii. *p.* 146. *Metten. Asplen. p.* 111. *Moore, Ind. Fil. p.* 131. Aspl. Odontites, *Brown, Prodr. Fl. Nov. Holl. p.* 151. Aspl. heterophyllum, *Rich. Fl. N. Zeal. p.* 74. Cænopteris flaccida, *Thunb. Nov. Act. Petrop.* ix. *p.* 158. *t. D. f.* 1, 2. *Sw. Syn. Fil. pp.* 87 *and* 281. *Schk. Fil.*

p. 77. *t.* 82. C. N. Zelandiæ, *Spr. Schk. Fil. t.* 82. Darea flaccida, *Sm. Mem. Acad. Turin.* v. *p.* 409. *Willd. Sp. Pl.* v. *p.* 296.

Hab. New Zealand, all the islands, *Forster, and all travellers.* S. E Australia, *Fraser* (entrance to Port Dalrymple). Blue Mountains, *Bynoe, Allan Cunningham.* Tasmania, *Fraser* (Mount Wellington), *Gunn*, n. 1533. Raoul Island, Kermadec group?, *M'Gillivray*, n. 951. small, a span high, with very large copious scales on the caudex, and few pinnæ 2 inches long and ¼ of an inch broad, breaking up into broad obovate pinnules (rarely dareoid), and n. 948 (approaching some of the common and simple forms, pinnæ lanceolate pinnatifid, with one auricle or pinnule at the superior base, all the segments free and dareoid). Thunberg's locality of the Cape of Good Hope is probably an error. Schkuhr's figure represents very accurately two of the more common forms of this variable species, of which Dr. Hooker, who has collected it in its native countries, says: "It would take many pages to enumerate half its protean forms." He himself enumerates five of the more conspicuous varieties, and Mettenius three; but, continues the former author, "they are connected by innumerable intermediate ones; indeed, the most opposite characters are sometimes presented by different parts of the same frond." He further remarks that in Australia and Tasmania the species does not vary so much as in New Zealand. It then becomes of some interest to ascertain, if possible, whether in other, and especially moister climates, still other forms of this species may not present themselves, not yet clearly recorded, which, as far as we now know of it, rarely departs from the true dareoid character. But we have already shown that *Aspl. lineatum*, of the *Salicifolium*-group, breaks up, if I may so say, into a perfect *Darea* in the *D. bifida*, Klfs., and *D. inæqualis*, Willd., and *Aspl. bulbiferum*, in our *Darcastrum* section, does the same in New Zealand: but if I am correct in showing that the East Indian *Aspl. bullatum* of Wallich and the same plant I have noted from South America, are identical with it, we do not find that *they* pass into the dareoid form. Indeed, Dr. Hooker says of *A. flaccidum*, "It passes by many states into *A. bulbiferum*," and under *A. bulbiferum* (Fl. N. Zeal.), he says, "Pendulous specimens appear to pass into *A. flaccidum*." Nor must the observation of a very acute botanist be overlooked, which I have recorded at p. 97, viz.: "that *Aspl. obtusatum*, Forst., under certain circumstances, in Norfolk Island becomes *A. flaccidum*." It requires diligent study of those plants in their native localities to come to a right decision on such points. From what we do know, however, of those supposed species, the most distinct, botanically speaking, in their extreme states, we see how impossible it is to speak confidently of the limits of this or that kind.

198. A. (Euasplenium) *rutæfolium*, Kze: caudex stout ascending in age as thick as a man's thumb paleaceous above with subulate long flexuose black-brown scales, stipites tufted 3–6 inches long compressed pale, fronds broad-lanceolate more or less acuminate tapering below subcoriaceous pale green a span to a foot and more long tripinnate (or subtripinnatifid) deciduously subsetaceo-paleaceous, primary pinnæ patent (never horizontal) petiolate ovato-lanceolate more or less acuminate nearly equally pinnated on both sides, superior secondary pinnæ entire, inferior ones once or twice forked lowest ones again pinnate, pinnules or segments sometimes forked all linear or subspathulate obtuse 1–3 lines

long patent often slightly falcate monosorous, veins single, sori short-oblong small quite marginal situated a little below the apex, involucres firm-membranaceous nearly white, rachises all winged.—*Kze. in Linnæa*, x. *p.* 521. *Pr. Tent. Pterid. p.* 108. *Pappe and Raws. Syn. Fil. Cap. p.* 23. *Metten. Asplen. p.* 110. *Moore, Ind. Fil. p.* 163 (*excl. β furcatum?*). Cænopteris, *Berg.* Darea, *Sm. Willd. Sp. Pl.* v. *p.* 298. Aspl. Stans, *Kze. l. c. Pappe and Raws. l. c.*

Hab. South Africa, Cape Colony to Natal, apparently frequent.—All the specimens I possess of this species from South Africa are very uniform in character, copiously bi-tripinnate, the inferior secondary pinnules so large and compound as to give the primary pinnæ an ovato-lanceolate form, and the fronds are lanceolate (not linear-oblong) in circumscription, tapering, with smaller pinnæ at the base. Hence I am disposed to keep the following species distinct from it.

199. A. (Euasplenium) *Borbonicum*, Hook.; caudex thick woody suberect clothed with brown ovate imbricated scales, stipites 4–6 inches long erect compressed, fronds a span to 14 inches and more in length oblong or linear-oblong shortly acuminate nearly as wide at the base as in the middle pale green bipinnate, primary pinnæ patent broad-linear 1–2 inches long, pinnules nearly all linear or linear-subspathulate straight or curved a few of the lower ones subcuneate and bifid the lowest superior one broader and rather larger subpalmate once or twice forked or rarely subpinnate, all obtuse at the points, veins solitary, sori solitary near the middle of the pinnule or segment oblong or linear, involucres firm-membranaceous nearly white, main rachis compressed, secondary ones alate.—Adiantum Borbonicum, *Jacq. Coll.* iii. *p.* 286. *t.* 21. *f.* 1. Cænopteris furcata, "*Berg. in Act. Petrop.* vi. *p.* 249. *t.* 7. *f.* 1." Aspl. achilleæfolium, *Lam.?* Aspl. bipinnatum, *Brack. Fil. U. S. Expl. Exp. p.* 170 ("A. furcatum;" *afterwards corrected*). Darea furcata, *Willd. Sp. Pl.* v. *p.* 297. A. rutæfolium, var. *b*, *Metten. Asplen. p.* 110 (*in part*). A. rutæfolium, *Moore, Ind. Fil.* β furcatum (*in part*).—Var. *palmatum;* lower, superior pinnules palmato-dichotomous, sori linear. Darea palmata, *Klfs. En. Fil. p.* 80. *Metten. Asplen. p.* 111. A. rutæfolia, δ palmatum, *Moore, Ind. Fil. p.* 163.

Hab. Mascaren Islands; Bourbon (*Mus. Hist. N. Paris.*), *Carmichael*, and Mauritius (var. *palmatum*), *Commerson*. Ovolau, Feejee Islands?, *Brackenridge*.—I possess specimens of this plant from Bourbon and Mauritius, collected by three different botanists, and these I find to be so uniform in character, so different from any of my copious specimens of the Cape *Aspl. rutæfolium*, that I am disposed to differ from those botanists who unite the two, and to agree with Will-

denow when he says, under this species: "Hanc et sequentem (*A. rutæf.*) conjunxerunt clarissi viri Thunberg et Swartz, sed revera inter se differunt." I find in the present species that the scales of the caudex are quite ovate, the frond by no means lanceolate, not tapering downwards, the fronds much less compound, especially towards the base of the primary pinnæ, consequently the latter are almost linear. One of my specimens has the lowest superior pinnule so far divided as to be palmato-dichotomous (scarcely again pinnate), and this is the most divided of any of the pinnules; the rest are very uniform, quite entire, or a very few of the inferior ones are bifid or forked. In short, in habit it more resembles *A. Belangeri* than it does *A. rutæfolium*. I have no means of knowing whether Mr. Brackenridge's *A. bipinnatum* is the same as this; if it be, it is an inhabitant of the Feejee Islands. But neither our Kew collector, Mr. Milne, nor Dr. Harvey, seem to have met with it there. If really *Darea furcata*, Bl., which he quotes under it, it is *A. Belangeri*. Mr. Moore brings under this species an Arabian plant of Forskal, the "*Lonchitis bipinnata*," but I know not on what authority.

200. A. (Euasplenium) *Thunbergii*, Mett. (an Kze.?); caudex "creeping cæspitose clothed with brown lanceolate membranaceous scales, stipites 3-4 inches long livido-stramineous," fronds 6–15 inches long broad-lanceolate acuminate dark lurid-green (when dry) membranaceous subtranslucent bi- rarely subtripinnate, primary pinnæ subsessile horizontally patent slightly curved upwards from a rather broadly cuneate base oblong obtuse 1½–2 inches long, pinnules oblong 4–5 lines long 1–1½ broad oblong or subspathulate obtuse entire rarely emarginate or subbifid the lowermost superior one the largest broad-cuneate bi-trifid or more rarely pinnatifid, veins conspicuous single and undivided except in the large basal pinnule where they are pinnated, sori linear-oblong solitary on the entire pinnules as many as there are segments on the divided pinnules where they open towards the costa in each case situated on the disc (distant from the margin), involucres quite membranaceous brown, main rachis compressed alate upwards, sparsely and fugaciously scaly, partial ones broad winged (so that in fact the pinnæ are pinnatifid).—*Kze. in Linnæa*, x. *p.* 517? *Metten. Aspl. p.* 114. *Pappe and Raws. Fil. S. Afr. p.* 24. Cænopteris articulata, *Th. Nov. Act. Petrop.* ix. *t. E. f.* 1? (*Sw.*).

Hab. Natal, *Gueinzius*, *Capt. Garden*.—Although Kunze is the author of the name *A. Thunbergii*, since he only gives the Cape of Good Hope as its locality, and combines with it the Java *Darea Belangeri* of Bory, I cannot but feel extremely or more than doubtful, if he had this particular plant in view. Moore's synonymy is also doubtful to me. Of this plant being the same as Mettenius's I can feel no question; yet, though he retains Kunze's name, he only gives Natal for the locality. Pappe and Moore do the same; and it is only from Natal that I have received the plant. The species is peculiar in many respects, in its creeping cæspitose rhizome (according to Mettenius), the outline of the frond is similar to that of *A. rutæfolium*, that is, diminishing in width at both extre-

mities. The ramification, too, has the less compound character of the var. *Stans* of that species; but instead of having the pale colour when dry, and firm, opaque, leathery consistency of that species, it is a deep lurid-green, quite membranaceous, semitranslucent, so that the veins come distinctly into view when held between the eye and the light: the pinnæ and segments are very broad, and, what is more remarkable, though with quite the habit of true *Darea*, none of the sori are marginal, but on the disc, in the broad and compound piunnles opening towards the costa, as in my *Dareastrum*-section. Kunze and Moore consider the *Cenopteris articulata*, Th. in Act. Nov. Petrop. ix. t. E. f. 2 (which I have no opportunity of consulting), the original authority for *A. Thunbergii* of Kunze: that was probably a Cape plant, but no recent author had described the present species.

201. A. (Euasplenium) *prolongatum*, Hook.; caudex small woody inclined rooting scarcely scaly, stipites 2–4 inches long tufted stramineous subcompressed, fronds 4–5 inches to a foot long at the utmost coriaceous or subchartaceous oblong or narrow linear-oblong often falcate suddenly terminating in a caudate naked extension of the rachis 1–2 inches long rooting at the very apex bi- scarcely tripinnate, primary pinnæ 1–1½ inch long horizontally patent generally approximate or crowded semiovate obtuse petiolate semipinnate (pinnules more numerous on the superior than the inferior side), pinnules 3–4 lines long mostly simple entire rarely forked still more rarely and only in the lowest superior pinnule bi- or tripartite, pinnules and segments narrow-linear often curved obtuse monosorous, veins single, sori oblong or linear very narrow marginal, involucres firm-membranaceous of the same pale green colour as the frond.—*Hook. 2nd Cent. of Ferns, t.* 42.

Hab. East Indies, on trees; Mishmee, *Griffith, Simons*, n. 235. Khasya, *Hooker fil. and Thomson*. Bhotan, *Booth*. Ceylon, *Mrs. General Walker, Gardner*, n. 1348. Tsus Sima, Gulf of Corea, *Wilford*.—Judging from the Indian and Ceylon stations quoted from the Hookerian Herbarium by Mr. Moore (Ind. Fil. p. 163), he refers this plant to his *Aspl. rutæfolium*, β *furcatum*, but to this view I cannot willingly subscribe. The plant is of a much smaller size, the caudex is different, and apparently not paleaceous, or exhibiting only a few insignificant scattered scales about the base of the stipites, the remarkable and very general prolongation of the rachis rooting at the point, the generally dimidiate pinnæ (that is, the suppression of two or more of the inferior pinnules on the lower side), the narrow-elongated pinnules, the most compound of which are rarely more than once forked, are all distinguishing marks not found in any form of *A. rutæfolium*, or of the so-called β *furcatum*. It is a very elegant, and, to my mind, well-marked species.

202. A. (Euasplenium) *Belangeri*; caudex short stout erect apparently formed of the united stipites and roots, stipites densely tufted 4 inches to a span long compressed upwards greenish, fronds 1–1½ foot long narrow-oblong (the

sides almost forming a parallelogram) acuminated only at the apex, sparingly stellato-squamulose beneath, here and there proliferous subchartaceous pale green bipinnate, primary pinnæ from 1–2 inches long horizontally patent singularly uniform in the whole length linear obtuse nearly sessile again pinnated (or they may be said to be deeply pinnatifid), pinnules or segments 2–3 lines long linear-clavate or subspathulate obtuse straight or a little curved decurrent with the rachis simple monosorous or the lowest superior one is bifid or subpinnatifid, veins solitary central, sori large conspicuous occupying nearly the length of the pinnule marginal, involucres colour and texture almost of the frond, main rachis compressed, partial ones distinctly winged.—*Kze. Bot. Zeit.* vi. *p.* 176. *Hook. Fil. Exot. t.* 41 (*where, for* Aspl. furcatum, *Bl. p.* 186, *read* Darea furcata, *Bl. p.* 207, *excl. syn.*). *Metten. Fil. Hort. Lips. p.* 71. *Metten. Asplen. p.* 111. *Moore, Ind. Fil. p.* 116? Aspl. Veitchianum ?, *Moore, Ind. Fil. l. c.?* A. Thunbergii, *β* Belangeri, *Kze.* (*olim.*) Darea Belangeri, *Bory, in Belang. Voy. Bot. p.* 51. Darea appendiculata, *Bl. En. p.* 206 (*fide De Vriese in Herb. Nostr.*). Aspl. decorum, *Kze. Bot. Zeit.* vi. *p.* 176.

Hab. Java, about Buitenzorg and on the lofty mountains, *Belanger, Blume, and Thos. Lobb* (*in Herb Nostr.*)—This is assuredly a very distinct species, as clearly shown by our figure and remarks in the 'Filices Exoticæ.' Its parallelogramic form is very peculiar, and the species appears to be confined to Java. Java specimens, from De Vriese, of *Darea appendiculata*, Bl., show that to be identical with *A. Belangeri*, and Kunze's *Aspl. decorum* is confessedly the same. The affinity of the species, however different, is clearly with *A. Borbonicum*, Hook., and *A. prolongatum*, Hook.

203. A. (Euasplenium) *dichotomum*, Hook.; small; caudex small rather stout erect rooting on all sides, paleaceous at the apex, stipites tufted an inch or a little more long slender compressed pale green deciduously setoso-paleaceous, fronds 3–4 inches long oblong acute membranaceous green subtripinnate, primary pinnæ ½–¾ of an inch long subdimidiato-ovate rather distant all petiolate dichotomous, pinnules scarcely more than ¼ of an inch long narrow linear acute once or twice forked the fertile segments subclavate, vein central, sorus quite marginal linear-oblong, rachises all compressed green.—*Hook. 2nd Cent. of Ferns. t.* 39.

Hab. Borneo, Kina Balou, *Hugh Low, Esq.*; Lobouk Peak, elev. 5000 feet, north-east side of Borneo, *Thos. Lobb.*—A small and extremely delicate species, the whole height scarcely exceeding 4 inches.

204. A. (Euasplenium) *Shuttleworthianum*, Kze.; "frond

ovate oblong acuminate coriaceous glabrous at the base tripinnato-pinnatifid less divided at the apex, inferior pinnæ subopposite long-petiolate remote, superior ones alternate short-petiolate approximate all ovate acuminate, primary and secondary ovato-oblong or oblong obtuse veined entire or bifid, fertile ones spathulate, stipes (?) and main rachis stout curvato-flexuose blackish-purple angled above plane beneath, partial rachises depressed furrowed on both sides curvato-flexuose purplish glabrous." *Kze. in Schk. Fil. Suppl. p.* 26. *t.* 14 (*very faithful*).—*Metten. Asplen. p.* 109. *Moore, Ind. Fil. p.* 168.

Hab. Pitcairn's Island, *Cuming*, n. 1374, *Mathews*, n. 5, *two to three feet long* (*Herb. Nostr.*).—By some accident my herbarium possesses no sample of this Fern from Cuming, although Kunze, Mettenius, and Moore, all quote n. 1374 of that collector. My very fine specimens of Mathews are identical, however, with Kunze's plant, and prove how accurately he has figured it both as to drawing and colour, but then comes the difficulty of distinguishing it from other allied and polymorphous species of this group. Mr. Moore, than whom few possess a more correct eye for distinguishing species of Ferns, has in my herbarium marked Mathews's specimen "*A. Shuttleworthianum*; an *A. bulbiferum*, var. *tripinnatum*, Hook. fil. Shorter sori?" And he has attached the same names and query to specimens of Milne and M'Gillivray from Sunday Island, Kermadie group, n. 578, 77, and 948 (ultimate segments very narrow, fertile ones almost subulate and incurved), and n. 80 (small specimens not a span long, but no two alike, some bearing broad polysorous pinnules closely approaching to *A. bulbiferum*, normal form). This *A. bulbiferum*, var. *tripartitum*, has, however, been since referred by Moore to *Aspl. Mertensianum*, Kze. (A. Fabianum, *Hombr. and Jacq.*). So great are the difficulties and uncertainties attending the right determination of many species of Ferns.

205. A. (Euasplenium) *Mertensianum*, Kze.; "frond ovato-oblong coriaceous (bright green) sparingly paleaceous bipinnato- (at the base subtripinnato)-pinnatifid less divided at the apex, pinnæ remote petiolate curved upwards patent inferior ones subopposite, middle and superior alternate, all trapezio-ovato-elliptical or shortly oblong acuminate, pinnules oblique ovato-oblong acute, inferior segments obliquely cuneate, once or twice bifid, superior ones often undivided sublinear all rather obtuse, sori large mostly solitary on the segments, secondary rachises plane margined, universal rachis and short stipes semiterete margined above sulcated flexuose livid-stramineous." *Kze. in Bot. Zeit.* vi. *p.* 525.—*Metten. Asplen. p.* 109. *t.* 5. *f.* 15, 16 (*ultimate pinnules only*). *Hombr. et Jacq. Voy. Pôl. Sud, t.* 3 *bis, f.* ζ. *Moore, Ind. Fil. p.* 128. A. tremulum, *Hombr. et Jacq. l. c. f.* Δ. (*this figure represents our plant better than the one immediately previous*). Cænopteris Fabiana, *Bory?* Darea prolifera, *Willd. Sp. Pl.* v. *p.* 299.

Hab. Bonin, *Dr. Martens* (*Herb. Nostr: from Imp. Acad. Peterab.: the authority for the species*). This is likewise marked in my herbarium by Mr. Moore "*A. Mertensianum*, Kze.; an *A. bulbiferum*, var *tripinnatum*, Hook fil." and the same names are similarly attached to a specimen from Bonin Islands gathered by *C. Wright, of the U. S. N. Pacif. Expl. Exped.*, and named "*Mertensianum*" by Mr. Eaton; this has some sterile and some fertile pinnæ broad, and the fertile segments singularly patent; and to a specimen given me from Sydney by *Mr. Bynoe*.—Too near some states of *A. Shuttleworthianum*, and, consequently, to *A. bulbiferum*, var. *tripinnatum*.

206. A. (Euasplenium) *multifidum*, Brack.; "stipites smooth angled sulcate scaly, fronds membranaceous tripinnate, primary divisions alternate imbricate oblong acuminate, pinnules oblong obtuse pinnatipartite, segments linear-oblong obtuse inferior ones bi-trifid, rachis sparingly scaly, sori semioblong submarginal, involucre entire." *Brack. Fil. U. S. Expl. Exped. p.* 171. *t.* 171.—*Metten. Asplen. p.* 110. *Moore, Ind. Fil. p.* 23.

Hab. Tahiti, Society Islands, and Ovolau, Feejee Islands; in damp forests, *Brackenridge*.—No authentic specimen of this has come under my observation. It must be a large species, "stipes 1½ foot long, and as thick as a goose-quill: fronds 2 feet and upwards in length." "It is one of the most graceful Ferns of the tribe, and is allied to the *A.* (*Darea*) *cicutarium* of Willdenow, but that is bipinnate, and its sori shorter."—The figure, however, does not at all accord with our ideas of that species, for it exhibits a primary pinna which alone is 10 inches long and 6 broad, and is itself tripinnate with very narrow, linear, ultimate pinnules or segments. May it not be the same as *A. Shuttleworthianum*?

207. A. (Euasplenium) *davallioides*, Hook.; caudex resembling a small oblong erect tuber scaly at the summit, stipites 3–4 inches long tufted compressed and margined below deciduously scaly, fronds 3–6 inches high subcoriaceous, young ones linear oblong simply pinnated with obovato-spathulate lobato-pinnatifid pinnæ which gradually enlarge and become compound forming fronds 5–6 inches long ovate acuminate green 3-subquadripinnate, primary pinnæ 2–3 inches long petiolate, secondary also petiolate the largest ½–¾ of an inch long broad ovate, ultimate pinnules small oblong very patent simple or bifid with segments singularly divaricating often falcato-recurved, sori copious solitary on the ultimate pinnules or segments occupying the entire segment opening at the margin when on the fork of pinnules often confluent, sori very short oblong, involucre firm-membranaceous spreading (open along with the opposite margin of the segment) overflowing with capsules and looking quite davallioid, rachis broad everywhere compressed and winged.—*Hook. in Florul. Hongkong. in Kew*

Gard. Misc. ix. *p.* 343. *Hook. 2nd Cent. of Ferns, t.* 40. *Moore, Ind. Fil. p.* 123.

Hab. Nangasaki, Japan, *Mr. Babington*, n. 101. Loochoo Islands, *C. Wright*. Tsus Sima, Gulf of Corea, *Wilford*, n. 791.—A species which cannot easily be mistaken for any other if the short and singularly divergent or patenti-recurved ultimate segments be considered, with the sori covering the whole segment, and the involucre so open as quite to look like a cup, and giving the idea of a dareoid species of *Davallia*, with which genus other *Dareæ* have no slight affinity.

208. A. (Euasplenium) *dimorphum*, Kze.; caudex "creeping thick," stipites 6–12 inches and more long, fronds ample 2 feet and more long chartaceo-membranaceous deltoideo-ovate a foot and more broad tripinnate, sterile and fertile different on the same or on different plants, pinnæ petiolate primary sterile ones horizontal broad-oblong or ovato-lanceolate 5–6 inches long again pinnate, secondary pinnæ petiolate rhomboidly ovate unequally cuneate at the base serrated and sublaciniated, inferior ones lobed in their lower half, lowest superior one pinnate below, pinnules cuneate serrated at the apex, fertile pinnæ numerous terminal often abruptly so, sometimes the broad sterile pinnæ have the serratures and lobes gradually becoming laciniated and fertile, in the perfectly fructified state all are deeply pinnatifid with narrow linear obtuse or acute segments patent or sometimes recurved not exceeding ½ an inch in length, veins central forking with the segments, sori linear solitary upon the segments or sometimes double one on each side the vein firm of nearly the same colour as the frond.—*Kze. in Linnæa*, xxiii. *p.* 233. *Metten. Asplen. p.* 108 (*excl. syn.* A. Nov.-Caledoniæ, *Hook.*). A. diversifolium, *A. Cunn. in Endl. Fl. Norf. p.* 10 (*not of Bl.*). *Moore, Ind. Fil. p.* 125. *Hook. 2nd Cent. of Ferns, t.* 37.

Hab. Norfolk Island, and nowhere else, as far as yet known.—This fine Fern, like the well-known *Osmunda regalis*, has the sterile pinnæ and the fertile ones quite different in form and composition, sometimes on the same plant (and then forming the upper portion); sometimes the two kinds are distinct.

209. A. (Euasplenium) *Novæ-Caledoniæ*, Hook.; stipes in my solitary specimen a foot long, frond (dimorphous?), fertile a span long and as much broad subrotundo-deltoid coriaceous pale whitish very laxly and irregularly tripinnate, primary and secondary pinnæ long-petioled dichotomously divided ultimate pinnules all fertile linear-elongate rostrate (generally contracted above the sorus), veining very indis-

tinct, sori long-linear entirely at the margin, involucres apparently of the same texture as the frond.—*Hook. Ic. Pl. t.* 911. *Moore, Ind. Fil. p.* 149.

Hab. New Caledonia, crevices of rocks in very dry and exposed places, *C. Moore.*—Mettenius, who seems only to know this Fern from my figure and description, is disposed to unite it with the preceding, *Aspl. dimorphum*. I allow that my specimen is very imperfect, for the probability is that it has two kinds of pinnæ, like the species just mentioned, whether on the same or on different plants but the pinnules are here so much elongated and almost rostrate, and the panicle, I might almost call it, is so loose and irregular, that, besides the great length of the ultimate pinnules or segments, the primary divisions, which in *A. dimorphum* bear a considerable relation to the sterile fronds, suggest the idea of sterile pinnæ very different also in this.

210. A. (Euasplenium) *brachypteron*, Kze.; caudex short stout erect creeping moderately scaly, stipites tufted 2–5 inches long pale brown or lurid scaly below, fronds spreading in our growing specimen 4–5 inches to a span and more long linear-oblong or lanceolate subcoriaceous dark-green (or brown when dry) bipinnate, pinnæ dimidiato-ovate on short petioles, pinnæ ¾ of an inch long mostly on the upper margin (suppressed below) and on both sides at the apex, pinnules or segments linear subspathulate entire lower ones (1–3) emarginate or bifid lowest superior one trifid a little larger than the rest, veins single, sori solitary near the middle of the pinnule or segment oblong marginal or submarginal, main rachis compressed margined above sparsely and deciduously scaly, partial rachises winged.—*Kze. in Linnæa*, xxiii. *p.* 232 (*name only*). *Hook. Fil. Exot. t.* 14. *Moore, Ind. Fil. p.* 117. A. obtusilobum, *Hook. Ic. Plant. t.* 1000 (*more equally pinnate and stoloniferous*). *Moore, Ind. Fil. p.* 151.

Hab. Tropical Africa, Sierra Leone, *D. Don*, *Whitfield*, *Barter* (*2nd Niger Exped.*). Madagascar, *Dr. Lyall.* Isle of Tanna, New Hebrides, *C. Moore.* Aneiteum, Naviti Levu and Ovalau, Feejee Islands, *Milne* (can this be the *Aspl. dubium* of Brackenridge?).—Mr. Moore lays much stress on the suppression of many of the inferior pinnules, so as to render the pinnæ subdimidiato-pinnatifid in *A. obtusilobum*, in distinguishing this as a species from *A. Dregeanum*; but I fear that character is too inconstant. In some, but not all, of the Madagascar specimens, the fertile pinnæ are dilated on one side along with the involucre, thus giving a hatchet-shaped form to those pinnules, and they are not unfrequently falcato-recurved.

211. A. (Euasplenium) *Drégeanum*, Kze.; "caudex slender creeping paleaceous, stipites short, fronds linear-lanceolate acuminate membranaceous pinnate, pinnæ alternate divergent or patenti-divergent shortly petiolate obliquely sub-

ovate obtuse uppermost ones cuneato-obovate smaller all truncate at the base above subauriculate on the lower margin abscisso-cuneate and entire superior margin and apex inciso-pinnatifid, the segments oblong rounded at the apex subincised lowest superior one cuneate bi-trifid, sori solitary upon the segments (generally on the disc distant from the margin), rachis slender flexuose above submarginate." *Kze. in Linnæa*, x. *p.* 17; *in Schk. Fil. Suppl. p.* 53. *t.* 27.—*Pappe and Rawson, Syn. Fil. Afr. Austr. p.* 22. *Metten. Asplen. p.* 114. *Moore, Ind. Fil. p.* 126.

Hab. Shady valley on a cataract near the Onozamcaba River, Natal, *Drége*.—My only specimens of this are from Drége. They quite accord with Kunze's figure and description. Mettenius refers to it the tropical African *Aspl. brachypterum* of Kunze and my 'Filices Exoticæ:' and although Moore, in his 'Index Filicum,' maintains these species as distinct, yet in my herbarium he has named all my native specimens of "*A. brachypterum*, *A. Drégeanum*." I am not sufficiently provided with specimens of *A. Drégeanum* to come to a satisfactory decision: but if Kunze is correct in describing the caudex (which I have not seen) as slender and creeping, it is very different from that of our growing plant of *brachypterum*, which is stout and erect aboveground, almost like a miniature tree-fern. *A. Drégeanum* seems to me in its fronds to stand in nearly the same relation with *brachypterum*, that *A. Thunbergii* of this group does with *A. rutæfolium*, var. *Stans*, being, like that, thin and membranaceous, and with the sori generally distant from the margin.

212. A. (Euasplenium) *viviparum*, Pr.; caudex short erect stout densely paleaceous at the summit with long membranaceous sphagnoid scales, stipites tufted 4–5 inches to a span long stout grooved in frond partially paleaceous herbaceous blackish below, fronds 1–2 feet long coriaceo-membranaceous dark green tripinnate, primary pinnæ 4–6 inches long horizontally patent broad-lanceolate acuminate often proliferous tripinnate, ultimate pinnules linear-subulate subfalcate and entire or bi-trifid with subulate segments, veining indistinct, sori linear-oblong situated at the very margin and occupying about one-third of the pinnule, involucre pale but firm and of the texture of the frond.—*Pr. Tent. Pterid. p.* 109 (*excl. syn. Humb., not of Bl.*). *Hombr. et Jacq. Voy. Pól. Sud, t.* 3. *f. K* (*primary pinnæ only, and no descr.*). *Metten. Fil. Hort. Lips. p.* 71. *Asplen. p.* 108. *Hook. Fil. Exot. t.* 64. Cænopteris vivipara, *Berg. Act. Petrop.* vi. *p.* 250. *t.* 7. *f.* 3. *Sw. Syn. Fil. p.* 89. *Wall. Cat. n.* 239. Darea vivipara, *Willd. Sp. Pl.* v. *p.* 302. D. fœniculacea, *Sieb.* Acrostichum, *Linn.*

Hab. Bourbon and Mauritius (*Bergius*), *Bojer*, *Bouton*, *Carmichael*, etc., growing in all forest grounds, on dead and decaying trees in ravines, bottoms of watercourses, etc.—Well distinguished by its finely cut, fennel-leaved fronds,

generally viviparous. I possess, however, a much less divided form from Bourbon, with broader segments, which may prove distinct.

213. A. (Euasplenium) *scandens*, J. Sm.; caudex thicker than a crow's-quill long creeping flexuose branched sparingly rooting paleaceous with small scales in the younger portions, stipites scattered very short almost none, fronds from 1–2 feet or more long broad oblong-lanceolate tapering much at the base subcoriaceo-membranaceous dark olive-green 3–4-pinnate, primary pinnæ horizontal 3–4 inches long broad-lanceolate sessile numerous but rather distant inferior ones gradually smaller deflexed extending to the base of the stipes, secondary pinnæ about an inch long shortly petiolate, ultimate pinnules 4–5 lines long narrow-linear the lower superior ones forked or trifid the rest simple all acute, fertile ones a little broader and somewhat hatchet-shaped contracted into a beak towards the apex, vein central that of the fertile pinna or segment near the margin, sori marginal oblong, involucre firm submembranaceous brownish, main rachis terete strict lurid-brown, partial rachises compressed subalate.—*J. Sm. in Hook. Journ. of Bot.* iii. *p.* 408 (*name only*). *Metten. Asplen. p.* 108. *Moore, Ind. Fil. p.* 165. *Hook. 2nd Cent. of Ferns, t.* 37.

Hab. Philippine Islands, Leyte, *Cuming*, n. 297. New Guinea, *Hinds.*—A peculiar and well-marked species.

214. A. (Euasplenium) *ferulaceum*, Moore; stipes 14 inches long stout pale brown sulcate in front, frond 18 inches supra-decompound (4–5-pinnate) bright green membranaceous deltoideo-ovate acuminate, primary pinnæ numerous but rather distant below horizontal the inferior 6–8 inches long petiolate broad ovate acuminate gradually smaller upwards, secondary pinnæ 3 inches long ultimate pinnæ short scarcely minute a line long narrow linear-spathulate bi-trifid all acute the segments mono- rarely disorous, vein central indistinct, sorus very small scarcely visible to the naked eye near the margin, involucre greenish submembranaceous, primary and secondary rachises terete stramineous glossy, ultimate very narrow linear compressed green.—*Hook. 2nd Cent. of Ferns, t.* 38. *Moore, MS. in Herb. Nostr. and in Ind. Fil. p.* 130 (*name only, no description*).

Hab. New Granada, *Hartweg*, n. 1519, and Quito, *Jameson, in Herb. Nostr.*—A very distinct and elegant, and hitherto undescribed, species, remarkable for the very compound, or rather decompound, finely cut pinnæ, and the terete primary and secondary rachises stramineous and glossy.

Species that are very dubious, probably either of the Darea *or* Dareastrum *group.*

Darea disticha, *Klf. En. Fil. p.* 180. Lonchitis bipinnata, *Försk. Fl. Eg. Arab. p.* 184.—Arabia Felix.

Darea Pteridis, *Bory, in Belang. Voy. p.* 52.—Mauritius.

Darea asplenioides, *Bory, in Belang. Voy. p.* 53.—Mauritius.

Darea obtusa, *Desv. in Berl. Mag.* v. *p.* 323.—Mauritius.

Asplen. dubium, *Brack. Fil. U. S. Expl. Exp. p.* 172.—Feejee Islands (sterile).

Cænopteris cuneata, *Desv. Annal. Linn. Soc.* vi. *p.* 267.

Cænopteris auriculata, "*Th. Nov. Act. Petrop.* 1791, 9, *t.* 2. *f.* 2."—Cape.

Darea thalictroides, *Fée, Gen. p.* 333.—Moore refers it doubtfully to *Aspl. thalictroides*, Kze. in Linnæa, xxiii. *p.* 238, and suspects it may be *Aspl. cicutarium*.—Jamaica.

C. ATHYRIUM. *Sori generally short; involucres lax, convex, straight or often more or less arcuate and even hippocrepiform, sometimes with the lobes unequal. Fronds pinnato-pinnatifid or bi-tripinnate.—Gen.* Athyrium,* *Roth.* Allantodiæ, *Sp. Auct.*

215. A. (Athyrium) *Filix-fœmina*, Bernh.; caudex ascending paleaceous with broad ferruginous scales, stipites tufted a span to a foot and more long stramineous-brown, fronds 1½–3 feet long oblong rather suddenly acuminate submembranaceous bi- rarely tri-pinnate, primary pinnæ numerous patent from a moderately broad nearly sessile base oblong-lanceolate acuminate 4–6 inches long, pinnules numerous approximate horizontally patent sessile ½–¾ inch long oblong rather obtuse, lower ones deeply pinnatifid the segments ovate with 2 or 3 strong and sharp serratures, superior ones more entire coarsely serrated uppermost ones confluent into a pinnatifid or serrated acumen, sori copious one to each segment of the pinnule near the rachis oblong, involucre very convex

* The genus *Athyrium* was formed by Roth, to include *Aspidium fontanum*, Sw., and *Asplenium Filix-fœmina*, Bernh. Brown says of these, "Ad *Asplenium* certe referendum *A. fontanum*, et vix ob involucrum basi arcuatum separari debet *A. Filix-fœmina* aliæque species hactenus ineditæ." Those who maintain the genus are by no means agreed as to the species that should be included in it.

straight or variously curved hippocrepiform membranaceous more or less fringed or erose at the margin.—*Bernh. Schrad. N. Journ. Bot.* 1806, i. *pt.* 2. *p.* 26. *t.* 2. *f.* 7 (sori). *Hook. et Arn. Brit. Fl. ed.* 7. *p.* 580. *Mett. Fil. Hort. Lips. p.* 79. *t.* 13. *f.* 15, 16 (pinnæ and sori excellent). *Asa Gray, Man. Bot. N. U. St. p.* 595. Nephrodium, *Mich. Fl. Bor. Am.* ii. *p.* 268. Athyrium, *Roth. Pr. Tent. Pterid. p.* 98. *t.* 3. *f.* 5 (involucres straight). *Moore, Brit. Ferns Nat. Print. t.* 30, 31, 32, 33, 34. Aspidium, *Sw. Syn. Fil. p.* 59. *Schk. Fil. p.* 56. *t.* 58, 59. *Willd. Sp. Pl.* v. *p.* 276. *Engl. Bot. t.* 1459. Polypodium, *Linn.* P. Rhœticum, *Linn. Herb.* P. molle, *Schreb.* Athyrium, *Roth.* P. dentatum, P. incisum, *and* P. oblongo-dentatum, *Hoffm.* Athyrium ovatum, *Roth.* A. laxum, *Schum.* A. lætum, *Gray.* A. cyclosorum, *Rupr.* A. Athyrium, *Spr. Schk. Fil. t.* 78. Aspidium asplenioides, *Sw. Syn. Fil. p.* 60. *Willd. Sp. Pl. Pursh. Fl. Am.* ii. *p.* 664. Nephrodium asplenioides, *Mich. Fl. Bor. Am.* ii. *p.* 268. Aspidium angustum, *Willd. Sp. Pl. p.* 277. *Pursh, Fl. Am.* ii. *p.* 661. Athyrium, *Pr.* A. Michauxii, *Spr. Kze.* Athyrium asplenioides, *Desv. Fée, Gen. p.* 186. *Moore, Ind. Fil. p.* 179. Asplenium elatius, *Link, Fil. Sp. p.* 94 (*fide Moore*). Polypod. dentigerum, *Wall. Cat. n.* 334. Athyrium tripinnatum, *Rupr.* (*fide Moore in Herb. Nostr.* var. broader and subtripinnate). Allantodia tenella, *Wall. MS. in Herb. Nostr.* (very slender and subcoriaceous). A. tenuifrons, *Wall. Cat. n. p.* 206 (var. *latifolium*, and with soft, white spinules on the upper side of the frond towards the apices of the pinnæ, on the rachis). Athyrium, *Moore.* Allantodia denticulata, *Wall. MS. in Herb. Nostr.* Aspl. strigillosum, *Moore. Lowe, Nat. Hist. of Ferns,* v. *t.* 36.—Var. *latifolium;* pinnules broader. *Hook. et Arn.* Athyrium ovatum, *Newm.*

Hab. Throughout Europe and Northern Asia. Himalaya, from the extreme N. West to Bhotan, *Wallich, Edgworth, Hook. fil. and Thomson*, elev. 10–12,000 feet, *Strachey and Winterbottom.* Kamtschatka, *Beechey.* Japan and Manchuria and Amur, *C. Wright, Wilford.* Crete, small specimen almost passing into *Aspl. Hohenackerianum*, and the same form is sent by *Schimper, n* 1270 and 740, from Abyssinia. Madeira, *Lowe and others* (a broad, deeply incised form). A. tenuifolium, *Lowe, MS.* Canaries, *Webb.* Algeria, *Bové.* N. America (quite identical with the European plant), Canada, *Goldie*, to N. Orleans, and westward to the Rocky Mountains; and to Oregon and British Columbia (often tripinnate), *Douglas.* S. America; Venezuela, *Fendler, n.* 405; Caracas, *Linden, n* 518. Cuba, *Pœppig.* Mexico, *Galeotti, n* 6425?—Considering the great geographical range of this plant and its liability to sport and even to become monstrous, it is, with some exceptions, pretty easily recognized; yet, notwithstanding, botanists have encumbered even the British plant with a host of synonyms, of which the careful Moore

has enumerated 18 different specific names, and has thought fit to record and name and define 31 varieties! Of these the var. *latifolium* is the most distinct-looking, as found at Keswick by Miss Wright, with the pinnules oval and broad subpetiolated and rather serrated than pinnatifid, the rachises of the pinnæ winged. I do not find any of the N. American forms to differ essentially from the European. I may be wrong in referring the *A. tenuifrons* of Wallich to this species, but I can see no essential difference, unless it be in the presence of spiculæ on the rachis, such as are found in some species of *Pteris*, but I do not think they are constant through all the individual species either in the one genus or the other. I cannot agree with Moore in making Blume's *A. nigripes* a var. of *A. tenuifrons*, add to which Blume's plant has been long published; Dr. Wallich's only by name, as far as I know, but, indeed, the two, as seen in my herbarium, are quite different.

216. A. (Athyrium) *arcuatum*, Mett.; "stipes 6 inches long, frond subcoriaceous dark green 2 feet long lanceolate bipinnato-pinnatifid, pinnæ alternate adscendenti-patulous 7–9 inches long 2–2½ inches broad elongato-lanceolate, pinnules divergent sessile alternate 1–1½ inch long 4 lines wide elongato-lanceolate broad-cuneate at the base rather obtuse at the apex deeply pinnatifid, segments subfalcato-ovate sharply crenate sinuses rather broad, costa canaliculate on the upper side prominulous at the back, veins pinnate, sori lunate near the costa, universal rachis flexuose channelled above convex beneath, partial rachises arcuato-ascending margined, here and there squamulose."—Athyrium, *Liebm. Fil. Mex. p.* 126. *Moore.*

Hab. Mexico, *Liebmann.*—Probably a large form of *Aspl. Filix-fœmina.*

217. A. (Athyrium) *Martensii*, Kze.; "rhizome ?, stipes stramineous 1 foot long, fronds rigid-membranaceous above dark beneath pale-green 1½ foot long below clothed with a few scales lanceolato-oblong acuminate bipinnate, primary segments lax shortly petiolate 7½ inches long obliquely patent curved or falcate upwards lanceolate a little attenuated at the base acuminated and lengthened at the apex and sharply serrate, pinnules rectangular-patent at the base obliquely truncate and adnate ovato-lanceolate deeply pinnato-partite at the apex obtuse inciso-serrate, segments on each side 5–9 oblong acutely inciso-serrate inciso-dentate at the subtruncated apex, costule pinnated the veins undivided, sori 1–2 at the base of the inferior laciniæ solitary at the base of the superior laciniæ hamate, involucre rigidly membranaceous fornicate waved at the margin." *Mett.—Kze. in Sillim. Journ.* vi. 1848, *p.* 86 (*name only*). *Metten. Asplen. p.* 200. Athyrium, *Moore.* Aspl. Michauxii, *Mart. et Gal. Fil. Mex. p.* 126. Athyrium Galeottii, *Fée, Gen. Fil. p.* 187.

Hab. Mexico, Pic d'Orizaba, 9500 feet, *Galeotti*, n. 6269 (the authority for the species), *Linden*, same locality, 12,000 feet. Mountains of California, *Bridges*, n. 303.—The three plants from the above localities are named *Martensii* in my herbarium by Mr. Moore, but I do not see how they differ specifically from *A. Filix-fœmina*. Fendler's n 405, from Venezuela, and Linden's, N. Granada, n. 1046, may be referred here or to *A. Filix-fœmina*.

218. A. (Athyrium) *Hohenackerianum*, Kze.; "frond membranaceous flaccid nearly glabrous opaque olivaceous paler beneath lanceolate long-acuminate slightly flexuose pinnato-pinnatifid or subbipinnate, pinnæ decurrent into a short petiole divergenti-patent rather remote obliquely oblong auricled above attenuate at the apex more or less obtuse lower ones divaricated abbreviated superior ones confluent, pinnules or segments ovato-elliptic subfalcate rotundate or truncate decurrently cuneate at the base more or less confluent, involucres bullate pale brown, partial rachises margined glabrous, primary short or shortish and the stipes angled loosely squamoso-paleaceous, rhizome short horizontal cæspitose densely ferrugineo-paleaceous."—Allantodia Hohenackeriana, *Kze. in Schk. Fil. Suppl.* ii. *p.* 63. *t.* 26. Asplenium, *Metten. Asplen. p.* 193. Athyrium, *Moore.*

Hab. East Indies: Canara, *Hohenacker*, *Pl. Ind. Or.* n. 211; Concan, *Law*; Scinde, *Stocks*; Matheran, 18,000 feet elev., *Col. Bates.* Cochin, *Rev. Mr. Johnstone.*—There are some small states of *A. Filix-fœmina* which a good deal resemble this, but it seems distinct, and is much smaller. The involucre, too, is very different, and singularly bullate, afterwards appearing to burst irregularly and to be reflexed, often giving the appearance of such an involucre as Mr. Brown describes to his genus *Allantodia*, but it is not so in reality.

219. A. (Athyrium) *cystopteroides*, Hook.; caudex long slender filiform repent sparsely scaly at the extremity, stipites scattered but approximate 2–6 inches long, slender stramineous glossy quite scaleless, fronds membranaceous 3–4 inches to a span long slightly glandulose narrow- or broad-lanceolate bipinnate, pinnæ subsessile more or less remote from a broad base gradually acuminate ½–1½ inch long, pinnules oblong-ovate pinnatifido-crenate terminal ones confluent entire, veins pinnate slightly hairy simple or forked, involucres small convex glandularly hispid lunulate or reniformi-orbicular.—Athyrium cystopteroides, *Eaton, in Proc. of the Am. Acad. of Arts and Sc.* 1859, *p.* 110.

Hab. Onsema, Katonasima, and Anakerima, Loochoo Islands, *C. Wright, U. S. N. Pacif. Expl. Exp.* 1853–56, *in Herb. Nostr.*—A not very distinct-looking species, yet in characters very different from any with which I am acquainted. In size and ramification it resembles small specimens of *A. Hohenackerianum*, but the long, filiform caudex, and very different involucres, will readily distinguish it, and in habit it somewhat approaches *Cystopteris fragilis.*

220. A. (Athyrium) *oxyphyllum*, Hook.; caudex very stout 1–2 inches in diameter ascending clothed with numerous persistent stipites of former years villous rather than paleaceous at the summit with very long (¾ of an inch) erect subflexuose ferruginous scales, stipites clustered 4 inches to a foot long stramineous glossy below shaggy with the same scales as crown the caudex, fronds 6–18 inches long from broad-lanceolate to subdeltoideo-ovate subcoriaceous generally much acuminated bi- rarely tri-pinnate, primary pinnæ 3–8 inches in length often flexuose from a broad base lanceolate sometimes spinulose on the costa above generally much acuminated and sharply serrated only at the apex, pinnules from an oblique cuneated base tapering into a distinct petiolule ovato-lanceolate acute lobato-pinnatifid at the margin auricled at the superior base serrated towards the apex, the lobes usually acute, sometimes the pinnules are again pinnated, veins pinnated, sori in two rows one on each veinlet near the middle, varying much in size rarely straight mostly curved or crescent-shaped, involucres often hippocrepiform brown membranaceous erose or fringed at the margin sometimes deciduous.—Polypodium oxyphyllum, *Wall. Cat. p.* 324. Athyrium, *Moore, Ind. Fil. p.* 126. Aspidium eburneum, *Wall. Cat. p.* 389 (pinnæ and pinnules more slender). Asplenium, *J. Sm. Cat. Cult. Ferns, p.* 6. *Metten. Asplen. p.* 194. Lastrea, *J. Sm. Cat. Cult. Ferns, p.* 47. Aspidium squarrosum, *Wall. Cat. n.* 356, *and in Herb. Nostr.* (Moore refers this to his *Athyrium foliolosum*). Polypodium drepanopterum, *Kze. in Linnæa*, xxiii. *p.* 318. Aspidium, *Braun, Ind. Sem. Berol.* 1856. *Metten. Fil. Hort. Lips. p.* 93. *t.* 19. *f.* 1–4 (*very good*).

Hab. Nepal, *Wallich*. Assam, Khasya, and Eastern Himalaya, *Griffith* (and Bhotan), *Hook. fil. and Thomson*.—A variable species, it must be confessed, remarkable for the very copious, rich, tawny, or long, slender, ferruginous scales on the caudex and base of the stipes.

221. A. (Athyrium) *selenopteris*, Mett.; "caudex oblique densely paleaceous with rather large ferruginous ovate acuminated scales, stipes stramineous a foot long sparsely scaly, frond glabrous 1½ foot long ovato-acuminate tripinnate, primary pinnæ remote obliquely patent petiolate 8 lines long lanceolate acuminate, secondary pinnæ shortly petiolate the superior base truncate the inferior cuneate trapezio-oblong attenuated at the apex obtuse pinnato-partite, the lowest ones pinnated, pinnules or lower segments incised generally

oblong above sharply dentate, superior ones falcate acute, sori at the costule of the inferior segments and solitary at the superior base of the upper laciniæ approximate to the costa lowest ones hamate superior ones unilateral, involucre membranaceous repandule." *Metten. Asplen. p.* 196. —Allantodia, *Kze. in Linnæa*, xxiv. *p.* 262. Athyrium, *Moore.*

Hab. Neilgherry Mountains.—With this I am unacquainted.

222. A. (Athyrium) *tenuisectum*, Hook.; "frond triplicato-pinnate membranaceous nearly glabrous, pinnules sessile lanceolate rather acute, secondary pinnules small adnate oblong obtuse inciso-serrate uppermost ones confluent, sori solitary, rachis and stipes dilatate channelled above furfuraceo-asperulous."—Aspidium tenuisectum, *Bl. En. Fil. Jav. p.* 170. Athyrium, *Moore.*

Hab. Temperate woods of Java, *Blume* —I am ignorant of this Fern, which Moore refers to *Athyrium*, probably in consequence of the affinity, to which Blume alludes, with his *Aspidium costale*, an undoubted Athyroid *Asplenium*. Metteniua does not appear to have noticed it either under *Aspidium* or *Asplenium*.

223. A. (Athyrium) *nigripes*, Mett.; "frond bipinnate membranaceous nearly glabrous, pinnæ petiolate oblongo-lanceolate acute, pinnules subdecurrent cuneato-oblong rather obtuse, lowest ones subpetiolate deeply pinnatifid, superior ones inciso-serrate confluent, sori near the costules, rachis glabrous, stipes trigonous below black and paleaceous." *Metten. Asplen. p.* 195.—Aspidium, *Bl.* Athyrium tenuifrons, *var.* β tenellum, *Moore, Ind. Fil. p.* 149, *and in Herb. Hook.*

Hab. Java, *Blume, in Herb. Nostr.* Ceylon, *Gardner, Thwaites*, n. 3067. N. India, *Edgworth.*—My Ceylon specimens quite accord with those of Blume.

224. A. (Athyrium) *macrocarpum*, Bl. (not Fée); "frond bipinnate subcoriaceous glabrous, pinnules sessile trapezoideo-oblong obtuse obtusely crenulate at the apex superior ones confluent, superior basal one larger repando-crenulate at its upper base subrotundo-auriculate, sori serial larger, involucres lacerato-fimbriate, rachises submarginate furfuraceous, stipes sparsely paleaceous." *Bl. in Herb. Nostr.* Aspidium, *Bl. En. Fil. Jav. p.* 162.—Athyrium foliolosum, *Moore, Ind. Fil. p.* 143, *vix Wall.?* Lastrea macrocarpa, *Moore, Ind. Fil. p.* 95. Aspl. fallax?, *Metten. Asplen. p.* 194. *t.* 6. *f.* 7, 8. Aspid. lanceum, *Kze.* Nephrodium, *Moore.*

Hab. Java, *Blume (in Herb. Nostr.)*, *Thos. Lobb*, *Zollinger? (Metten.)*. Khasya, *Griffith*. Ceylon, *Gardner*, 1372. Upper Assam, *Griffith*. Khasya, *Griffith*, *Hooker fil. et Thomson*, elev. 5–6000 feet. Sikkim, *Hooker fil. et Thomson*.—My specimens from the above localities of the continent of India are named *foliolosum*, Wall., by Moore (different from my specimens from Wallich under that name), and the *Asplenium macrocarpon* of Blume, in my herbarium, (unquestionably Blume's *Aspid. macrocarpon*, of his Enumeratio Fil. Jav.), he makes a synonym to it. If Mr. Moore be correct in the reference, the long published character of Blume's *macrocarpon* will entitle his name to the preference. The two in question are probably the same, but there are such variations in the specimens that it is hard to define them, and equally so to define the limits of this and the allied Indian species. Mettenius's figures of the pinnæ and pinnules of his *A. fallax* well represent Blume's *A. macrocarpon*.

225. A. (Athyrium) *Nigritianum*, Hook.; whole plant when dry quite black paler below, caudex short thick erect fibroso-radicose, stipites aggregated stout 5–6 inches long shaggy (as well as the stout rachis) with brown subulate villous scales, fronds 1–1½ foot long firm-coriaceous rigid lanceolate acuminate attenuate below by the inferior dwarfed remote pinnæ bi-tripinnate, primary pinnæ numerous 2 rarely 3 inches long narrow-oblong acuminate nearly sessile, pinnules 2–3 lines long (the largest of them) all petiolulate obliquely rhomboid obscurely and obtusely auricled at the superior base sublobate serrato-dentate, middle ones more lobed inferior ones 3-lobate or ternately pinnate, ultimate pinnules broad-cuneate subrhomboid, lowest pair reflected upon the main rachis, veins obscure sunk subflabellately dichotomous, sori 1–3 rarely 4 on each pinnule or lobe rather small oval-oblong, involucre straight firm-coriaceous convex entire almost black, primary rachis furrowed above, secondary ones slender, naked.—*Hook. 2nd Cent. of Ferns, t.* 44.

Hab. Prince's Island, Fernando Po, *Barter*, *n.* 1898.—A distinct and very peculiar *Asplenium*, which has no very near relationship with any species known to me; remarkable for its firm rigid habit, very stout stipes, and main rachis, shaggy with woolly hair-like scales, and the very black colour of the entire plant when dry. I place it in the *Athyrium*-section with some hesitation, on account of a certain peculiarity of habit, and of the convex involucres, which are very firm and coriaceous, and nearly of the same colour as the (dried) frond.

226. A. (Athyrium) *aspidioides*, Schlecht.; caudex "ascending," stipites pale brown glossy 6–8–12 inches long paleaceous at the base with large broad lanceolate-acuminate fronds 1–2(–4, *Schlechtendal*) feet long broad-ovate membranaceous tender dark green tripinnate, primary pinnæ 6–8 inches long subflexuose very distant short-petiolate patent ovato-lanceolate acuminate, secondary pinnules ½–2 inches

long distant subsessile from a broad base gradually attenuated, pinnules 2–4 lines long patent oblong obtuse cuneate at the base decurrent so as to form a winged rachis, pinnatifid segments very acute at the apex often bidentate, veins pinnated veinlets simple or forked, sori one to each lobe or segment near the costule more or less curved, involucre rather small membranaceous convex, primary and secondary rachises slender stramineous often flexuose.—*Schlecht. Adumbr. Fil. Cap. p.* 24. *t.* 13 (*very good*). *Metten. Asplen. p.* 196. *Pappe and Rawson, Syn. Fil. Cap. p.* 21. Aspidium scandicinum, *Willd. Sp. Pl.* v. *p.* 283 (*not Kaulf.*). Allantodia, *Kaulf. En. Fil. p.* 179 ("*in part*"). Athyrium, *Moore*. Nephrodium, *Bory, in Belang. p.* 63. Cystopteris, *Desv.* Asplenium Poiretianum, *Gaud. Bot. Freyc. p.* 327. *t.* 13 (*very good*). *Brack. Fil. U. S. Expl. Exp. p.* 176. A. multisectum, *Brack. l. c. p.* 174. *Metten. Asplen. p.* 197.

Hab. Bourbon, *Flügge, Herb. Mus. Par.* (*in Herb. Nostr.*). South Africa, especially eastward of the Cape Colony, *Bergius, Mundt.* Natal and Grahamstown, *Gueinzius, J. L. Meade* (*in Herb. Nostr.*). Madagascar, *Bojer.* Ceylon, *Mrs. Genl. Walker; Gardner*, n. 1346 *and* 1065. Neilgherries, *Sir F. Adam.* Sandwich Islands, *Gaudichaud, Beechey, M'Rae, Douglas*, n. 41; *Nuttall.* South America, Pacific side, Ecuador, *Seemann* (*in Herb. Nostr.*).—A well-marked and widely distributed species, with much divided fronds and finely cut pinnules, when dry of a very dark, almost black-green colour. Both the figures above referred to well represent the characters of the plant.

227. A. (Athyrium) *Goringianum*, Metten.; "frond thin-coriaceous glabrous, stipes 6 inches long stramineous loosely paleaceous, frond 6 inches long deltoid acuminate bipinnate, primary segments on each side 10–12 approximate patent falcate lowest ones 3 inches long petiolate broad-lanceolate superior ones elongato-oblong all caudato-acuminate mucronately inciso-serrate at the apex, secondary ones approximate obliquely patent at the base attenuate and adnate subpetiolate 6–10 lines long from an inferior base cuneato-truncate auricled trapezio-oblong or lanceolate falcate cuspidato-acuminate deeply pinnato-partite, segments 3–5 on each side narrow-oblong mucronato-appressedly serrate, basal ones the largest (costulam sub angulo 25° decurrentem excipientes), veins immersed 3–4 on each side decurrent at an angle of 10°, the lowest ones bearing a hippocrepiform sorus approximate to the sinuses of the segments minute, superior sori costular 1–2, involucre rigidly membranaceous entire." *Metten. Asplen. p.* 198. *t.* 6. *f.* 11, 12.—Aspidium, *Kze. Bot. Zeit.* vi. *p.* 557. Lastrea, *Moore.*

Hab. Japan, *Goring*, *n.* 115; *Dr. Babington*.—Dr. Babington's specimen entirely accords with the figure and description of Mettenius.

228. A. (Athyrium) *Sandwichianum*, Mett.: "quite glabrous, frond ovate tripinnate, pinnæ and primary pinnules petiolate oblong, secondary ones sessile lanceolate obtuse pinnatifid, lowest segments bifid, superior ones linear entire acute, tertiary rachis winged, sori straight." *Pr.*—*Metten. Asplen. p.* 197. Athyrium, *Pr. Epimel. Bot. p.* 67. Mettenius quotes A. Gaudichaudi, *Fée, Gen. Fil. p.* 188?

Hab. Oahu, Sandwich Islands (*Meyen*), *Hook. Herb. from Herb. Lambert?*—I have seen no authentic specimens of this Fern of Presl. His description is not sufficiently satisfactory to enable me to say if the specimens I have received from the Sandwich Islands, given to me by Mr. Lambert, be the same or not. It agrees in one particular: "Ab *A. Poiretiano*, quod quoque in insulis Sandwichensibus provenit, distinctissima," *Pr.*

229. A. (Athyrium) *pectinatum*, Wall.; caudex long ascending subrepent scaly, "stipes 7 inches long stramineous, frond membranaceous glabrous 1½ foot long oblongo-lanceolate, below short- at the apex long-acuminate bipinnate, primary pinnæ subdistant subopposite patenti-divergent falcate, in the middle 4½–5 inches long shortly petiolate oblongo-lanceolate caudato-acuminate at the apex deeply mucronato-inciso-serrate, lowest ones remote, secondary pinnæ numerous approximate rectangular-patent short-petiolate from an oblique subequally truncate base ovato-oblong obtuse again pinnated or pinnatifid, segments (or ultimate pinnules) approximate 6–8 on each side linear-oblong adnate at the attenuated base and confluent so as to be pectinato-pinnatifidly incised, serratures acute or cuspidate approximate, lower ones here and there bifid, nerves at an angle of 20°, sori approximate to the costule of the pinnule, the lowest inferior hamate, involucre membranaceous entire." *Metten.*—*Wall. Cat. n.* 231. *Metten. Asplen. p.* 197. Athyrium, *Pr. Moore.*

Hab. Nepal, *Wallich*. North-west India, *Edgworth*, *T. Thomson*. Above Simla, *Col. Bates*, *n.* 52.—The above character from Mettenius well describes this, which has somewhat of the outline and texture of *A. Filix-fœmina*, but a more compact and neater form, and the incised pinnules of *A. scandicinum*, to which, perhaps, it is too nearly allied.

230. A. (Athyrium) *crenatum*, Fries; caudex "creeping," stipes a span to a foot long stramineous or tawny-brown almost black at the base and there clothed with large glossy brown ovate acuminated scales, frond a span to a foot long membranaceous triangular bipinnate with the secondary pinnæ deeply pinnatifid or tripinnate, primary pinnæ spread-

ing oblong-lanceolate petiolate, secondary shortly petiolate or sessile 1–2 inches long from a rather broad base oblong or ovato-oblong subobtuse deeply pinnatifid nearly to the rachis (especially in the lower half) or again pinnate, segments or pinnules oval-oblong 1½–2 lines long very obtuse more or less lobed (mostly so on the superior margin), lobes short rounded entire or more or less dentato-serrated, serratures obtuse or acute or even spinulose, veins pinnated veinlets simple or forked oblique, sori rather small straight or curved sometimes diplazioid, involucres pale brown at length tumid suberose at the margin.—Var. *a*; segments or pinnules obtuse or obtusely serrated. *Fries, Summa Veg. p.* 253. *Kze. Bot. Zeit.* viii. *p.* 277. *Ledeb. Fl. Ross.* iv. *p.* 518. Athyrium, *Rupp. Moore, Ind. Fil. p.* 180. Aspidium, *Sommerf. Hartm.* Cystopteris, *Fries, Mant.* iii. *p.* 195. *Hook. Sp. Fil.* i. *p.* 200. Asplen. *and* Aspid. Sibiricum, *Turcz. Kze. Anal. Pterid. p.* 25. *t.* 15.—Var. *β*; segments and pinnules spinuloso-serrate. Cystopteris spinulosa, *Maxim. Fl. Amur p.* 340. **Athyrium Hookerianum, *Moore, MS. in Herb. Hook.***

Hab. Var. *a*. Sweden, Norway, and Lapland, apparently common, *Fries, Sommerfelt, Blyth, and others* (*in Herb. Nostr.*). Dahuria, *Turczaninoff*. Japan, *Dr. Babington*, n. 109.—Var. *β*. Sikkim-Himalaya, elev. 10–12,000 feet, *Hook. fil. et Thomson*. Manchuria, *Wilford*, n. 1163. Amur, *Maximowicz* (Cystopteris spinulosa): it is said also to be found in Siberia.—This very distinct species I briefly noticed in the first volume of the present work, p. 200, under the name of *Cystopteris crenata*, Fr., when I possessed only imperfect specimens, and when the species was supposed to be peculiar to northern Europe; and I then expressed my belief that it would prove to be an *Athyrium* of Presl. I have since received specimens showing that it inhabits northern Asia, as well as northern Europe. There are two forms, however, with and without spinulose teeth to the pinnules: some of these pinnules have a great resemblance to those of *Aspl. Filix-fœmina*, but the outline of the frond is widely different in the two, and the sori are much smaller.

231. A. (Athyrium) *decurtatum*, Lk.; "trunk erect clothed with pale membranaceous ovate scales, stipes stramineous at length naked, frond 2–3 feet long membranaceous pubescent on both sides especially at the margin oblong-lanceolate pinnate, pinnæ 4–5 inches long 6–8 lines wide subarticulated shortly petiolate lanceolate-acuminate deeply pinnato-partite, laciniæ from a slightly broader base oblong or elongato-oblong rather obtuse entire or slightly denticulate, lower ones abbreviated, secondary vein pinnated with undivided branches, sori short oblong or oval 6–10 in two series at the costule of the segments the superior basal ones of the supe-

rior laciniæ curved hippocrepiform rarely diplazioid, involucre tender pubescent above at the margin." *Metten.*—*Link, Sp. Fil. p.* 94. *Metten. Fil. Hort. Lips. p.* 77. *t.* 13. *f.* 17, 18. *Asplen. p.* 201. *Lowe, Nat. Hist. Fil.* v. *t.* 52. Athyrium decurtatum, *Pr. Tent. Pterid. p.* 98. *Moore.*

Hab. Brazil.—Is this any way different from *Aspl. thelypteroides?* It seems to be only known in a state of cultivation. It is greatly to be desired that those who invent and describe new species in plants of such difficult determination as the species of this family, would offer some remarks on their affinities.

232. A. (Athyrium) *gymnogrammoides*, Kl.; "frond triplicato-pinnate subcoriaceous and as well as the rachis and stipes quite glabrous, pinnules subsessile lanceolate rather obtuse, secondary pinnules (small) adnate oblong obtuse, lowest superior one larger inciso-dentate the rest confluent sharply dentate at the apex, sori large near the costules sparse, universal rachis and stipes dilated channelled above," caudex very large densely rooting copiously paleaceous with large ferruginous lanceolate lacerated scales, stipites densely tufted stramineous glossy scaly below. *Bl.*—A. gymnogrammoides, *Kl. Metten. Asplen. p.* 193. *t.* 6. *f.* 13, 14. Aspidium costale, *Bl. En. Fil. Jav. p.* 170. Asplenium, *Bl. in Herb. Hook.* (*not Sw.*). Athyrium, *Moore.* Aspl. foliolosum ?, *Wall. n.* 359. Blume has the following vars.: "*Var.* B; frond more slender, pinnules smaller, secondary setaceo-dentate.—*Var.* C; frond ovate or oblong coriaceous, pinnules more cuneate at the base sparingly muricate at the costa, secondary ones obsoletely denticulate.—*Var.* D; frond ovate coriaceous shining, pinnæ very much acuminated, pinnules approximate sparingly muricated on the costa above, secondary ones obovate denticulate at the apex."

Hab. Mountains of Java, *Blume, in Herb. Nostr.*, *Thos. Lobb*, n. 272, quite according with Blume's specimens, as do specimens from India proper, the Neilgherries, *Sir Fred. Adams*, *Gardner*. Ceylon (*Klotzsch*), *Gardner*, n. 1344 and 1345. Copious specimens from the following localities are greener and more membranaceous, but they are all marked *costale* by Mr. Moore, and many have the pinnules more deeply cut, to which Mr. Moore gives the name of var. *dissectum:* they have considerable affinity with *Aspl. macrocarpum;* Khasya, elev. 5–6000 feet, *Hook. fil. et Thomson*, n. 205; *Griffith* (fronds often 2 feet long). Sikkim, abundant, *Hook. fil. et Thomson*, n. 206, elev. 9–10,000 feet. Nepal, *Wallich*, n. 231 (this is marked "*costale*, var. *dissectum*," by Moore, but is *A. pectinatum*, Wall.). Wallich's n. 359 ("*A. foliolosum*, Wall.") is also so marked by Moore, in my herbarium, *A. costale*, and probably correctly: but this and its allies are particularly difficult to determine. Mettenius's figure of *Aspl. gymnogrammoides* seems quite to accord with this, and hence I adopt that name, though not a very appropriate one.

233. A. (Athyrium) *medium*, Carm.; caudex ?, stipes 5-6

inches long stout stramineous black at the swollen base clothed especially in the lower half with long flexuous ferruginous subulate scales, frond a span long rigid-coriaceous deltoid acute bipinnate, pinnæ opposite horizontal sessile moderately distant uppermost ones confluent 2–3 inches long ovato-lanceolate, pinnules approximate ½–¾ of an inch long broad-lanceolate subcuneate at the sessile base acute pinnatifid apex entire superior base auricled, segments ovato-oblong acute slightly falcate, veins pinnate forked once or twice, sori near the costa copious one to each lobe (2 or 3 in the auricle and lower lobes, involucres (young) rotundato-reniform pale brown membranaceous eroso-fimbriate at the margin, rachises slightly winged above from the decurrent bases of the pinnules more or less villous with tawny hair-like deciduous scales.—*Hook. Ic. Pl. t.* 43. Aspidium medium, *Carm. in Linn. Trans.* xii. *p.* 511. Aspid. internubium, *Carm. MS. in Herb. Nostr.* Athyrium, *Moore, Ind. Fil. p.* 96.

Hab. Tristan d'Acunha, on the table-land, *Dr. Carmichael.*—A very distinct and very rare species, only I believe found in the island just mentioned. "Stem (caudex) about 6 inches high, crowned with a circle of fronds from 9–12 inches high."

234. A. (Athyrium) *latifolium*, Sturm; "quite glabrous, frond ovate bipinnate, pinnæ subopposite subsessile linear-oblong narrow-acuminate, pinnules sessile obtuse pinnatifid lowest ones ovate superior oblong-lanceolate, segments obovate inciso-dentate, secondary rachis winged, sori incurved." *Presl, Tent. Pterid. p.* 98.—*Epimel. Bot. p.* 66. *Metten. Asplen. p.* 200. *Sturm, Fil. Chil. p.* 28.

Hab. Chili, *Cuming*, according to Presl, and repeated by Sturm; but no one else recognizes such a species from that country.

235. A. (Athyrium) *grammitoides*, Hook.; caudex creeping densely rooting, stipites approximate 3–4 inches long copiously scaly, fronds 4–10 inches long lanceolate-acuminate firm-membranaceous subhispidulous pinnate pinnatifid at the apex, pinnæ 1½ inch long patent approximate lanceolate subfalcate obtuse superior base auricled all lobato- or dentato-pinnatifid especially towards the base subpetiolate, sori large in two rows oblong, involucres slightly curved moderately convex strongly ciliated, inferior ones often diplazioid, main rachis slightly winged upwards.—*Hook. Ic. Pl. t.* 913. *Metten. Asplen. p.* 184. Diplazium, *Pr. Epimel. Bot.*

p. 84. *Moore, Ind. Fil. p.* 135. Aspl. confluens, *Kze. Bot. Zeit.* vi. *p.* 174 ?

Hab. Luzon, *Cuming*, n. 56, *Thos. Lobb.* Sandwich Islands, *Bidwill.* Mahableshwar and Matheran ?, *Col. Bates* (*an sp. distincta ?*, pinnæ more regularly pinnatifid, stipes scaleless).—It is very doubtful whether this should be considered a *Diplazium* or an *Athyrium*.

236. A. (Athyrium) *thelypteroides*, Mich.; caudex stout creeping, stipites rather distant on the caudex a foot or more long stramineous glossy brown below, fronds 1–3 feet long submembranaceous dark green lanceolate-acuminate firm pinnate, pinnæ subremote horizontal 3–4 inches long sessile from a broad base linear-oblong acuminated deeply almost to the rachis pinnatifid, segments oblong-elliptical ½ of an inch long horizontal entire or obscurely serrated very obtuse, veins mostly simple-pinnated, sori linear-oblong in two series approximate upon the segments soon confluent, involucres convex pale firm-membranaceous entire convex at the margin straight, rachis stramineous.—*Mich. Fl. Bor. Am.* ii. *p.* 265. *Willd. Sp. Pl.* v. *p.* 336. *Schk. Fil. p.* 71. *t.* 76 *b* *(very accurate)*. *Asa Gray, Man. B. N. U. St. p.* 627. *Metten. Fil. Hort. Lips. p.* 78. *Asplen. p.* 184. Athyrium, *Desv. Moore.* Diplazium, *Pr.* Aspl. acrostichoides, *Sw. Syn. Fil. p.* 275.

Hab. North America; Canada (*Goldie*) to the Middle United States, frequent. Northern India, north-west provinces, *Edgworth*; above Simla, *Col. Bates.* Sikkim-Himalaya, elev. 9–10,000 feet, *Hook. fil. et Thomson.* River Amur, Chinese Tartary, *Maximowicz.*—A very distinct and handsome species. North Indian specimens are clearly identical with the North American form.

237. A. (Athyrium) *brevisorum*, Wall.; caudex ?, stipes 1½ foot and more long stramineous brown below scarcely a line wide glossy, frond 1½–2 feet long ovato-lanceolate membranaceous bi-tripinnate, primary pinnæ long-petiolate remote erecto-patent a foot and more long broad-lanceolate acuminate, secondary pinnæ 5–6 inches long lanceolate nearly sessile pinnated, pinnules numerous approximate oblong-lanceolate much acuminate horizontally patent 1–1½ inch long coarsely serrated rarely subpinnatifid the serratures very acute almost mucronate lowest pinnules more distant on short petiolules intermediate ones more approximate the lower base decurrent, upper ones confluent, veins pinnated, veinlets forked once or more, sori generally in two rows oblique near the costule in the pinnules that are pinnatifid

extending to the lobes small short-linear straight or lunate, involucres slightly convex jagged at the margin, main rachis stramineous glossy flexuose.—Aspl. brevisorum, *Wall. n.* 220 (*not Metten., which is* Aspl. sylvaticum, *fide Moore*). Athyrium brevisorum, *Moore, under* Asplenium, *Ind. Fil. p.* 117 (*but omitted under* Athyrium *at p.* 180).

Hab. Toong Dong, mountains of Ava, *Wallich*. Mishmee, *Griffith*.—I have received besides a young specimen of a Fern which I can hardly distinguish from this, marked by Kunze "*Allantodiæ sp. ?*, nunquam fertilis visa, Port Natal, *Gueinzius*." The original plant I have only received from the two localities above mentioned. It is a well-marked species, and may rank near *Aspl. achilleæfolium*.

238. A. (Athyrium) *achilleæfolium*, Liebm.; caudex moderately stout horizontal paleaceous with black subulate scales, stipites 6–12 inches long livid-green, fronds 1–2 feet long broad-lanceolate submembranaceous dull-green bipinnate, pinnæ subpetiolate lanceolate or ovato-lanceolate acuminate 2½–4 inches long, pinnules ½–¾ of an inch long lanceolate acute patent separated by a rather wide sinus and decurrent so as to form a brong-winged rachis pinnatifid halfway down with lanceolate acute entire segments slightly incurved, veins pinnated (a veinlet to each segment), sori dareoid rather small at the inner margin of the segment but extending downwards beyond the sinus, involucre nearly plane pale brown membranaceous straight or subhippocrepiform, main rachis winged only at the apex.—*Liebm. Fil. Mex. p.* 97. *Fée, 9me Mém. Foug. p.* 27. *Metten. Asplen. p.* 201. *Moore, Ind. Fil. p.* 109. Cænopteris achilleæfolia, *Mart. et Gal. p.* 63. *t.* 16. Athyrium achilleæfolium, *Fée, Gen. p.* 186. *8me Mém. Foug. p.* 83. Aspl. grande, *Fée, 8me Mém. Foug. p.* 82.—Var. *β*, *pinnatifido-serratum*; pinnules more oblong, segments shorter, sori upon the disc of the pinnules distant from the margin of the segments. Athyrium conchatum, *Fée, Gen. p.* 188 (*excl. fig. at t.* 17).

Hab. Mexico, *Galeotti, n.* 6279, *Linden* (Vera Cruz), *without a number*. Mirador, *Liebmann, in Herb. Nostr.*—Var. *β*. Volcan de St. Martin, Vera Cruz, *Galeotti, n.* 6569. Guatemala, *Skinner*. A most distinct species of *Asplenium*, with rather small sori, of which the involucres are remarkable for being acute or almost acuminated at the extremity.

239. A. (Athyrium) *conchatum*, Moore; caudex "a creeping rhizome," stipes 2 feet and more long stramineous-brown glossy very stout ¼ an inch broad an inch at the very base, frond ample 3–4 or more feet long broad-ovate lanceolate

acuminate firm-membranaceous dark green pinnated, pinnæ numerous distant horizontal 1 foot long 1½ inch wide on short petioles oblong-acuminate mostly falcate deeply pectinato-pinnatifid rarely and only at the very base pinnate, pinnules numerous ¾ of an inch long more or less approximate often subfalcate oblong obtuse coarsely serrated those of the apex confluent into a serrated acumen, veins pinnated, veinlets always simple obliquely patent one to each serrature, sori short oblong one to each veinlet near the costule, involucre firm subcoriaceous very convex dark brown rarely and only at the very base diplazioid, rachis stout brown terete.—Asplenium conchatum, *Moore, Ind. Fil. p.* 49. Athyrium conchatum, *Fée, Gen. Fil. on the plate t.* 17 *C. f.* 1 (*not p.* 189, *which is* Aspl. achilleæfolium). Hypochlamys pectinata, *Fée, Gen. Fil. p.* 200. *t.* 17 *C. f.* 3. Allantodia costalis, *Desv. Mém. Soc. Linn.* vi. *p.* 265. Asplenium costale, *Moore, Ind. Fil. p.* 121 (*not of Sw. and Mettenius*). Diplazium brevisorum, *Sm. in Cat. Cult. Ferns* (*not his En. Fil. Philipp.*).

Hab. St. Domingo (*Fée*). Jamaica, *Bancroft, March*, n. 334, *Wilson*, n. 540, *Purdie, Alexander*.—This is probably a rare species, as I have only received it from Jamaica: and it is a very noble and well-marked one. It is the authority for Fée's genus *Hypochlamys*, by mistake figured l. c. under two different names on the same plate. Those figures accurately represent the fructification, but other botanists, as well as myself, have failed to see the characteristics of his proposed new genus, *Hypochlamys*. The involucres are, indeed, of a peculiarly firm and subcoriaceous texture, and are long persistent. The author describes two other species from St. Domingo, namely *H. Tussaci*, Fée, and *H. squamuloso*: but I have seen no specimens, and have no means of knowing if they are distinct from the present. He has also *H. Sorzogonensis*, from Luzon, "*Aspl. ambiguum*, Schk.," a truly diplazioid Fern.

(*Involucres quite terete, very membranaceous, tender, and brittle, often bursting irregularly*.—Allantodia, *Br.; from* αλλας, αλλαντος, *a sausage*.)

240. A. (Athyrium) *umbrosum*, J. Sm.; caudex very stout ascending scaly clothed with the creeping remains of old stipites, stipes dirty-brown a foot and more long stout paleaceous with large dark brown broad lanceolate scales, frond broad-ovate or subdeltoid membranaceous 3–5 feet long tripinnate, primary pinnæ distant 6–10 inches long oblong-ovate acuminate, secondary ones 2–3 inches long nearly sessile approximate oblong-acuminate tertiary (or pinnules) oblong-lanceolate acute sessile and more or less decurrent scarcely ½ an inch long inciso-pinnatifid segments acute or

bidentate superior ones confluent, veins pinnate simple or forked, sori copious 5–6 on each pinnule short oblong, involucre fornicate very membranaceous soon breaking irregularly in the middle or at the inner margin, primary and secondary rachises stramineous terete, tertiary more or less winged by the decurrent bases of the pinnules.—*J. Sm. in Hook. Journ. Bot.* iv. *p.* 174 (*not Kaulf.*). *Metten. Fil. Hort. Lips. p.* 79. *Asplen. p.* 192. *Webb. and Berthel. Fl. Canar. Pt.* ii. *p.* 442. Allantodia, *Br. Fl. Nov. Holl. p.* 149. *Kze. in Linnæa*, xxiii. *p.* 218. Aspidium, *Sw. Syn. Fil. p.* 60. *Schk. Fil. p.* 59. *t.* 61 (A. axillare *on the plate*), very good as to the sori and involucres. *Willd. Sp. Pl.* v. *p.* 283. Athyrium, *Pr.* Polypodium, *Ait.* Allantodia oligantha, *Desv.* Aspidium, *Desv.* Asplenium Aitoni, *Moore, Ind. Fil. p.* 111. Asplenium axillare, *Webb. et Berth. Fl. Canar. Pt.* ii. *p.* 442. *Metten. Asplen. p.* 200. Allantodia, *Kaulf.* Aspidium, *Sw. and Willd.* Aspidium caudatum, *Sw. Syn. Fil. p.* 55. *Willd.* Tectaria, *Cav.* Athyrium, *Pr.* A. Azoricum, *Fée.* Asplenium Aitoni, **β** axillare, ***Moore, l. c.***

Hab. Madeira, Canary Islands, and the Azores, *Masson and others*.—All my specimens have come to me under the name of "*umbrosum*," and I have seen no native ones that I could consider in any way distinct, yet very able botanists have maintained the *Aspl. axillare* as a different species, but none of the descriptions given nor the figures referred to appear to sanction such a distinction. It is true the plant cultivated in the Royal Gardens as *A. axillare* is larger, more distantly pinnated, and has the frond more drooping at the extremity, and has more obtuse pinnules, but these are characters which will hardly constitute specific difference. Moore, indeed, unites the two, but makes a var. β of *A. axillare*, without any definition. This is the type of Mr. Brown's *Allantodia*, a name suggested, I have heard that distinguished man say, by Dryander, from the peculiar form of the fructification. The involucre is nearly cylindrical, "e vena lateraliter ortum, eique utroque margine insertum." I cannot distinguish that mode of insertion, but it is certain that besides opening at the inner margin, often in a very broken and irregular manner, it bursts equally and irregularly in the middle, though this seems to me due to the extremely fragile texture of the involucre, rather than to any peculiar organization.

241. A. (Athyrium) *australe*, Brack.; "fronds bipinnate deltoid membranaceous flaccid, pinnules pinnatifid attenuated at the apex, lobes oblong obtuse inciso-serrate plurisorous, involucres oblong."—*Brown. Brack. Fil. U. St. Expl. Exp. p.* 173. *Moore, Ind. Fil. p.* 115. Allantodia australis *and* A. tenera, *Br. Prodr. Fl. Nov. Holl. p.* 149. Asplenium Brownii, *J. Sm. Hook. fil. Fl. N. Zeal.* ii. *p.* 36. *Fl. Tasm.* ii. *p.* 147. *Hook. Ic. Pl. p.* 978. *Metten. Fil. Hort. Lips. p.* 79. *Asplen. p.* 192. Asplenium assimile, *Endl. Prodr. Fl. Norf. p.* 30. Asplenium spectabile, *Wall. Cat. n.* 237.

Metten. Asplen. p. 196. Athyrium, *Pr.* Asplenium multicaudatum, *Wall. Cat. n.* 229 (often subcoriaceous). Allantodia sylvatica, *Bl. En. Fil. Jav. p.* 173, *and in Herb. Nostr.* Asplenium, *Moore, Ind. Fil. p.* 43. *Metten. Asplen. p.* 193. Asplenium basilare, *Moore, l. c. p.* 49. Athyrium, *Fée.* (*Moore adds as synonyms to* Allantodia sylvatica, *Bl.*, Diplazium brevisorum, *J. Sm.*, Diplazium brachysorus, *Metten.*, Asplenium brevisorum, *Metten. Asplen. p.* 192, *not Wall., and* Brachysorus Woodwardioides, *Pr.*) Asplenium physosorum, *Sieb. Fl. Mixta, n.* 268 (*in Herb. Nostr.*).

Hab. Australia, Port Jackson, *Brown and others.* Moreton Bay, *Dr. F. Mueller.* Tasmania, New Zealand, and Norfolk Island, apparently abundant. India: Java, *Blume;* Neilgherries, Nepal, Mysore, Sikkim, very frequent, *Wallich, Griffith, Hook. fil. and Thomson.*—It is familiar to all who have devoted much time to the study of Ferns, that the larger and more compound species are peculiarly liable to vary. The same species is more or less compound according to age, and the younger and less divided pinnæ and pinnules are usually broader and of a more membranaceous texture than the older; hence a great difficulty in drawing up tangible specific characters; and hence authors who have not extensive suites of specimens at command, are led into the error of making new species when the differences only arise from age or some accidental circumstance. The Fern before us seems to me to be in this case. I have willingly followed Moore in uniting the *Asplenium axillare* with *A. umbrosum*, but I shall need the indulgence of botanists in venturing to introduce numerous synonyms under the present species, and in going a step further, and expressing an opinion that even this may not be specifically distinct from *A. umbrosum*. Other authors, indeed, have paved the way for such a union. For a long time *A. australe* was supposed to be peculiar to Australasia, whence, too, its name *australe*. Dr. Hooker has remarked in his Fl. Nov.-Zelandiæ, that "it is very similar to, if not identical with, species from the Malay and Society Islands, East Indies, and S. America." I am disposed to consider all the East Indian *Allantoid* group known to me, except *A. fimbriatum*, identical with *A. australe*. Blume says of his *Allantodia sylvatica*, "Maxime affinis *Allantodiæ umbrosæ*, cui tamen differt laciniis pinnularum æqualiter serratis, venulisque bifidis, haud simplicibus;" characters really of no moment. Again, Brackenridge, who had gathered living specimens from plants both of *A. umbrosum* and *A. australe*, says of the latter, "This has very much the appearance of *A. umbrosum*, but the segments are not so deeply serrated, and the indusium is less membranaceous."

242. A. (Athyrium) *hians*, Kze.; "frond bipinnato-pinnatifid ovato-oblong glossy above and deep green pale beneath, pinnæ oblong-lanceolate erecto-patent acute distant pinnate decurrent towards the apex attenuated, pinnules pinnatifid lanceolate shortly petiolate remote obtuse at the base towards the apex long-attenuated confluent, segments oblong obliquely acute obsoletely serrated involute at the margin, rachis and stipes subcompressed yellowish-brown sulcato-striated above convex beneath paleaceous at the base, involucre allantodioid."—Diplazium, *Kze. Kl. in Linnæa*, xx. *p.* 361. *Metten. Asplen. p.* 188.

Hab. Columbia, Merida, *Moritz*, n. 269 (*Klotzsch, in Herb. Nostr.*). Mettenius adds: "*Funck and Schlim*, n. 605, n. 1225, n. 958, and *Triana*, n. 32;" and I may add from my herbarium, as quite according with Klotzsch's original specimen: New Granada, *Linden*, n. 503, 533, *and* 1016. Jamaica, *Purdie*. Ecuador, *Jameson*. Bogotá, *Holton*, n. 42.—The involucres are brown, delicate, and very fragile, quite bullate, bursting very irregularly, exactly as in *Allantodia*, Br. Indeed, some of the East Indian forms of *Aspl. australe*, Br., are scarcely distinguishable from this. It is to be regretted that authors of the many new species of this compound group of *Eudiplazium*, give no figures, nor offer any remarks on the affinities of their species.

243. A. (Athyrium) *fimbriatum*, Hook.; caudex?, stipes stout darkish-brown glossy 1 foot and more long copiously paleaceous most so towards the base with large glossy tawny lanceolato-subulate scales, frond ample 2–3 feet long ovate or subdeltoid acuminate firm-coriaceous subpolystichoid 4-pinnate, primary pinnæ petiolate (as are the secondary and tertiary ones) 6–12 inches long distant from a broad base lanceolate much acuminate, secondary ones also distant of the same shape but not acuminate 1–1½ inch long numerous, ultimate pinnules ovato-lanceolate ¼ of an inch long superior basal one the largest acute all pinnatifid with acute lobes auricled at the superior base, terminal ones subconfluent, sori 2–5 on each pinnule broad-oblong or in age almost globose very prominent and copious, involucre brown membranaceous broad generally crescent-shaped or subhippocrepiform fimbriated extremely convex soon forced back by sori, rachises all pale-brown glossy more or less flexuose.—Aspidium fimbriatum, *Wall. Cat. n.* 339; *not* Athyrium foliolosum, *Moore, Ind. Fil. p.* 92.—An Aspl. decipiens, *Metten. Asplen. p.* 195. *t.* 6. *f.* 9, 10?

Hab. Nepal, Kumaon, *Wallich;* sent to the museum of the India House in 1823, under the name "*Aspid.?* (*Nephrod.?*) *fimbriatum*, Wall., an *Hemitelia* generis, R. Br.?," *Strachey and Winterbottom*. Above Simla, *Col. Bates*. Sikkim, elev. 8–9000 feet, *Hook. fil. and Thomson*.—A very fine Asplenioid Fern, with quite the sori and involucres of the two preceding *Asplenia*, and the habit of a very compound *Polystichum*. Dr. Wallich distributed more than one or two species under the name of "*foliolosum*," but I have no specimens of this so named by him.

Kunze gives ample specific characters and some remarks on the following Asplenioid Ferns from Java, which he refers to Mr. Brown's genus *Allantodia*, but so variable are the individuals of this group, that many species may be constructed out of one if partial or fragmentary specimens are selected; and even with entire and perfect fronds it is hardly possible to make the descriptions intelligible without figures upon a large scale. I must content myself with a reference to these, which Mettenius places among the Diplazioid *Asplenia*, Moore with true *Asplenia*.

A. (Allantodia) *paludosum*, Kze. in Bot. Zeit. vi p. 191. Mount Gédé. "Zippell. n. 352 Z."—"Ex affinitate *A. axillaris*, Br."—It will be seen that I have referred some East Indian Ferns of this group to *Aspl. australe*.

A. (Allantodia) *nitidulum*, Kze. Bot. Zeit. vi. p. 191. Java.—"*Aspl. aspidioidi*, Schlecht., affinis."

A. (Allantodia?) *scabrum*, Kze. Bot. Zeit. vi. p. 192. Java.—"Affinis est nostra paullo *Allant. scandicinæ*, Klfs. (vix dubie eadem cum *Aspl. Poiretiano*, Gaudich. in Freyc. Voy. Bot. t. 13), sed scabritie et forma pinnularum diversa."

A. (Allantodia) *deflexum*, Kze. in Bot. Zeit. vi. p. 191. Java.—This seems to be only known from the Amsterdam Botanic Garden in a young state and in cultivation, and is described as the smallest and amongst the least compound of all the *Allantodiæ*. It is unnoticed by Mettenius. Moore refers it to *Asplenium*, but is it not the *A. deflexum* of Mettenius (*Diplazium*, J. Sm.), which is *Aspl. tomentosum* of this work? Other dubious species of the *Athyrium*-group of *Asplenium* I prefer to bring into a foot-note.*

D. DIPLAZIUM.—*Involucres double, but generally accompanied by single or asplenioid ones; and these frequently predominate.* Gen. Diplazium, *Sw.*

(Eudiplazium-*group.*—*Veins free, rarely anastomosing.*—Hook. Gen. Fil. TAB. LV. B. and LVI. B.)

* *Fronds undivided.*

244. A. (Eudiplazium) *lanceum*, Th.; caudex long-repent rooting sparingly scaly, stipites distant 4 inches to a span long slender thickened at the base and paleaceous with black scales, fronds chartaceous firm opaque longer than the stipes rarely an inch wide lanceolate attenuated and acuminated at each extremity entire sometimes a little repand, costa slender prominent beneath, veins horizontal fascicled the superior and sometimes the inferior branch only fertile, sori linear distant remote from the costa often diplazioid.—*Thunb. Fl. Jap. p.* 333. *Ic. Plant. Jap. Dec. II. t.* 18. *Sw. Syn. Fil. p.* 74. *Willd. Sp. Pl.* v. *p.* 303. *Hook. in Florul. Hongkong. Kew Gard. Misc.* ix. *p.* 342. Diplazium, *Pr. Kl.* Aspl. subsinuatum, *Hook. et Grev. Ic. Fil. t.* 27. Aspl. erosum *and* A.

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* Dubious species of *Asplenium*, supposed to belong to the *Athyrium*-section:—*Aspl. macrochlæna*, Metten. Asplen. p. 195. *Cystopteris fragilis*, Mart. et Galeot. MS. Mexico. Fragments only known to Mettenius.——*Aspl. gracile*, Don, Prodr. Nep. p. 8. Nepal. Probably *Aspl. tenuifrons*, Wall.; Metten. Asplen. p. 199, which I have considered a form of *A. Filix-fœmina*.——*Aspl. alpestre*, Hoppe; Metten. Asplen. p. 199, Europe, is *Polypodium* (Phegopteris) *alpestris*, Spr.——*Athyrium aspidioides*, Pr. Darea, *Willd.* India? Perhaps a small state of *Aspl. Filix-fœmina*, *Asplenium*, Metten. Asplen. p. 199.——*Athyrium incisum*, Fée, Gen. p. 187; Metten. Asplen. p. 199. Central France. Probably *Aspl. Filix-fœmina*.——*Athyrium Corsicum*, Fée, Gen. p. 187; Metten. Aspl. p. 199. Corsica. An *Aspl. Filix-fœmina?*——*Athyrium Schimperi*, Moug.; Fée, Gen. Fil. p. 187; Metten. Asplen. p. 200. Abyssinia.——*Asplenium distans*, Don, Prodr. Nep. 9; Metten. Asplen. p. 200. *Athyrium*, Moore, Ind. Fil. p. 125. Nepal.——*Athyrium Dombeyi*, Desv. Ann. Linn. Soc. vi. p. 266; Metten. Aspl. p. 200. Peru.

rigidum, *Wall. MS. in Hook. Herb.* Scolopendrium dubium, *Don, Prodr. p.* 9.

Hab. Japan, *Thunberg, Goring.* Amakerima Island, *C. Wright*; and Tsus Sima, Gulf of Corea, *Wilford.* Loochoo Islands; Formosa, *Wilford.* Hongkong, *Dr. Lorraine, Hance, Harland, Wilford* East Indies: Nepal, *Wallich.* Khasya Hills (one specimen deeply forked at the apex), *Simons.* Numklow, *Hook. fil and Thomson.* Ceylon, *Gardner, n.* 1335, *Thwaites.*—This has about equal claim to rank either as *Euasplenium* or *Diplazium.* Sometimes the two kinds of sori are mixed on one frond, at other times they are uniformly all one or the other.

245. A. (Eudiplazium) *subserratum*, Bl.; caudex "creeping elongated," fronds membranaceous 1½ foot long an inch to an inch and a half wide glabrous and satiny elongato-oblong lanceolate sharply acuminate moderately attenuated below obtuse or acute at the base, towards the middle sinuato-crenate coarsely dentato-serrated nearer the apex, costa slender firm prominent beneath, veins fascicled horizontal or nearly so, one to three of the exterior branches soriferous, sori distant often curved, involucres frequently diplazioid, narrow-linear occupying about two-thirds of the space between the costa and margin, stipes 1–2 inches long slender terete. (TAB. CLXIV. B.)—*Bl. En. p.* 174. *Metten. Asplen. p.* 90.

Hab. Java, *Blume, Thos. Lobb.*—A distinct species, yet nearly allied to the preceding, and I regret that my figure cannot be accompanied by the caudex, which none of my specimens possesses. The veins are fasciculate and transverse (horizontal); at the origin from the costæ are three branches, two outer ones undivided, and one or other or both of these bear a sorus; the middle branch is once or twice forked; if once forked, it is sterile, if twice forked, the superior branch is fertile; but in all cases a middle forked branch is always sterile; hence the sori are far apart. It is remarkable that neither Blume nor Mettenius notice the diplazioid sori.

246. A. (Eudiplazium) *lonchophyllum*, Kze.; "frond membranaceous glabrous linear-lanceolate acuminate, shortly cuneate or obtuse at the base, towards the apex especially crenato-dentate, costa slender, veins repeatedly forked, sori abbreviated slightly curved subirregular, stipes short, rhizome obliquely descending rooting and as well as the base of the stipes fusco-paleaceous." Diplazium, *Kze. in Bot. Zeit.* vi. *p.* 192 (*not in Linnæa*, xiii. *p.* 141). Asplenium, *Metten. Asplen. p.* 161. "D. Sundense, *Hassk. Cat. Pl.*"

Hab. Java, *Zollinger, n.* 3092 and 1508 (and *Goring* and *Hasskarl*, according to Mettenius).—The above character so well describes the *Aspl.* (Diplaz.) *subserratum* of Blume (a species acknowledged to be unknown to Kunze), that I cannot but think the two plants are identical. Kunze has probably been misled by the diplazioid sori of *A. subserratum* not having been described by Blume.

247. A. (Eudiplazium) *plantagineum*, L.; caudex subterranean densely clothed with coarse wiry radicles and crowned with a few black scales, stipites tufted a span and more long slender subterete a little scaly below, fronds coriaceous subspithameous 2–3 inches wide broad-elliptical lanceolate acuminate obtuse at the base entire or serrated especially at the apex, costa rarely slender, veins horizontally patent fascicled each fascicle 3–4 times forked, outer branches soriferous, sori slender unequal in length sometimes extending from near the costa almost to the margin.—*Linn. Sp. Pl. p.* 1537. *Metten. Asplen. p.* 161. Diplazium, *Sw. Syn. Fil. p.* 91. *t.* 2. *f.* 4. *Willd. Sp. Pl.* v. *p.* 351. *Schk. Fil. t.* 85. *Hook. Gen. Fil. t.* 55 *B.* Hemionitis, *Sm. Act. Taur.* v. 410. Diplaz. acuminatum, *Raddi, Fil. Bras. p.* 41. *t.* 57 *b*; *and* D. repens, *Raddi, Syn. Fil. p.* 103.—Var. *β. subhastatum*; frond at the base on each side with a large lobe, leaves subhastate. —Var. *γ. auriculatum*; frond with a small free elliptical auricle on each side at the base.

Hab. West Indian Islands and tropical America; Jamaica, *Brown*, *Purdie*. Guadeloupe, *L'Herminier*. Mexico, *Galeotti* (4000 feet elev.), *n.* 6398; *Linden*, *n.* 28; *Liebmann*. Guatemala, *Skinner*. Venezuela, *Fendler*, *n.* 164. New Granada, Ocaña (elev. 5000 feet), *Schlim*, *n.* 499. Brazil, *Raddi*, *Moricand*, *Gardner*, *n.* 30.—*β.* Tovar, in Venezuela, *Moritz*.—*γ.* Guadeloupe, *Beaupurtuis*, in *Herb. Nostr.*—A striking and very distinct species, with a caudex forming a stout, descending, woody rhizome, densely clothed with very coarse wiry fibres. The two varieties here noticed exhibit a disposition to become pinnate; indeed, in var. *γ* the small auricles represent pinnæ, being distinct from the rest of the frond, but quite sessile. A specimen of the common form, from Brazil, is proliferous on one side at the base.

248. A. (Eudiplazium) *castanæfolium*, Sw.; fronds simple ovato-lanceolate mucronate serrated at the apex.—*Sw. Syn. Fil. p.* 91. *Willd. Sp. Pl.* v. *p.* 351. *Metten. Asplen. p.* 162. Callipteris, *Bory, Voy. aux* 4 *Iles d'Afrique*, i. *p.* 282.

Hab. West Indies; Island of St. Thomas, *Bory*.

** *Fronds pinnated below only.*

249. A. (Eudiplazium) *Zeylanicum*, Hook.; caudex terete repent subterraneous naked black, stipites remote solitary 4 inches to a span long paleaceous with lax dark subulato-lanceolate scales, fronds subcoriaceo-membranaceous a span to a foot long 1–2 inches broad lanceolate acuminate deeply pinnatifid in the middle pinnate at the base serrated only towards the apex, lobes and pinnæ horizontal oblong obtuse, veins pinnated entire or forked, sori linear, involucres with

the superior basal one principally diplasioid.—*Hook. 2nd Cent. of Ferns, t.* 16.

Hab. Ceylon; banks of a large stream of Kotmalee Oja, elev. 4000 feet, *Gardner, n.* 1249, *Thwaites.*—I possess only two specimens from the above locality, and have ventured, in the work just mentioned, to constitute a new species of them; though it may possibly eventually prove to be a young form of some described and more compound one. The fructification is, however, copious and perfect.

250. A. (Eudiplazium) *pinnatifido-pinnatum*, Hook.; caudex erect thick with very coarse rooting fibres, stipites aggregate furrowed in front rather stout a foot and more long, fronds 9–10 inches long broad-ovate nearly as broad as long firm-coriaceous opaque, pinnæ large 13–15 4–5 inches long very patent 1½ inch wide from a rather broad-cuneate nearly sessile base oblong-lanceolate acuminate strongly serrated those of the upper half of the frond confluent at the base terminal segment large lobed at the base, veins in pinnated fascicles very patent, sori narrow-linear all diplazioid, frequently short and approximate to the costa.

Hab. Mishmee, *Griffith.*—This diplazioid *Asplenium* is remarkable for the lower half, or nearly so, of the frond being pinnate, while the upper half, by the confluence of the bases, is deeply pinnatifid, with a large terminal segment; the pinnæ are coarsely serrated, very opaque, and void of gloss. I have seen it in no other collection but that of the late Mr. Griffith.

*** *Fronds pinnate; pinnæ often confluent at the acuminated apex.*

251. A. (Eudiplazium) *pallidum*, Bl.; caudex ?, stipes a foot or more long stramineous or subcastaneous deciduously scaly at the base, frond 1½–2 feet long ovate acuminate subcoriaceous often pale whitish-green when dry pinnated, pinnæ numerous approximate mostly petiolate horizontal 5–6 inches long ½–¾ of an inch broad from a somewhat rounded or obliquely cuneated base linear-oblong acuminate falcate sharply and subspinulosely serrated, terminal one petiolate and similar to the rest or larger and broad and pinnatifid at the base from being formed of dwarfed and confluent pinnæ very coarsely serrated towards the finely acuminated apex, veins very patent immersed generally twice dichotomous the lowest superior branch (arising from near the costa) bearing the linear sorus along its whole length rarely diplazioid and only from 1–3 at the superior and mostly truncated but not auricled base, involucres narrow firm-membranaceous.—*Bl. En. Fil. Jav. p.* 176. *Kze. in Bot. Zeit.* vi. *p.* 146. *Metten. Asplen. p.* 176. *t.* 5. *f.* 9, 10 (*single pinna, nat. size, and sori*

magnified—very faithful). *Moore, Ind. Fil. p.* 151. Aspl. calophyllum, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 408. *Metten. Asplen. p.* 176.

Hab. Java, *Blume, Thos. Lobb*, n. 223; *Millett.* Luzon, n. 188, and S. Camarines, *Cuming, etc.* (more membranaceous, very brown when dry, sori frequently diplazioid, involucres membranaceous while young).—Moulmein, *C. S. P. Parish.* —This is certainly a diplazioid *Asplenium*, and on some specimens the double sori exceed the single ones in number, while in others scarcely a double sorus is to be seen.

252. A. (Eudiplazium) *proliferum*, Brack.; "cæspitose, stipites semiterete sulcate pubescent, fronds membranaceous glabrous elongato-lanceolate pinnate, pinnæ alternate horizontal oblongo-lanceolate obtusely serrated auriculato-truncate at the base, inferior ones petiolate, uppermost ones confluent, rachis proliferous and as well as the costa pubescent, involucres membranaceous narrow."—*Metten. Asplen. p.* 149. Diplazium, *Brack. Fil. U. S. Expl. Exp. p.* 140.

Hab. Tahiti, Society Islands, *Brackenridge*, who gives neither figure nor any remarks on the affinities.

253. A. (Eudiplazium) *crenato-serratum*, Bl.; "fronds pinnate coriaceous glabrous, pinnæ alternate shortly petiolate (terminal ones sessile) elongato-linear-lanceolate very acuminate unequally rotundate at the base duplicato-crenato-serrulate parallelo-furcato-venose, sori oblique, stipes and rachis glabrous." *Bl. En. Fil. Jav. p.* 177.—*Metten. Asplen. p.* 177. Asplenium pallidum, *Moore, Ind. Fil. p.* 121 (*but he does not include it under* A. pallidum *at p.* 151). A. glaberrimum, *Metten. Fil. Hort. Lips. p.* 75. *t.* 11. *f.* 1, 2, *according to Metten. Asplen. p.* 177 (*this Moore refers, Ind. Fil. p.* 135, *to* Diplazium glaberrimum).

Hab. Java, *Blume.*—Blume's plant is too imperfectly described: he adds, indeed, "Ab *Aspl. pallido* vix differt niai pinnis elongatis crenato-serrulatis, sorisque longioribus marginem frondis attingentibus." Mettenius, however (*l. c.*), refers his *Aspl. glaberrimum* to that species, and of this he has given a figure in his Hort. Fil. Lips., showing it to be a diplazioid plant with auricled pinnæ: and, if this is the normal form, it is a species with which I am unacquainted.

254. A. (Eudiplazium) *alternifolium*, Bl.; caudex thick erect short, stipites stout paleaceous with subulate scales a foot and more long, fronds ovate pinnate about a foot long coriaceous and dark green when dry, subcarnose when recent, dark glossy green above paler beneath, pinnæ 3–5 inches long all free on very short petioles broad-ovate or ovate

shortly acuminate obtuse or obliquely subcordate at the base entire or obscurely sinuato-dentate, terminal pinna large long-petiolate sometimes with a lobe on one side near the base, veins nearly horizontal once or twice forked subfasciculate clavate at the apex of the branches just within the margin, sori continuous elongated frequently extending from the costa nearly to the margin diplazioid and asplenioid.—*Metten. Hort. Fil. Lips. p.* 75. *t.* 12. *f.* 1, 2. *Hook. Fil. Exot. t.* 17. Diplazium, *Bl. En. Fil. Jav. p.* 190. *Kze. in Bot. Zeit.* vi. *p.* 193. D. integrifolium, *J. Sm. Cat. Cult. Ferns, p.* 47.—Var. *oblongifolium* ; gemmiferous, pinnæ elongated much acuminated sometimes very coarsely serrated.

Hab. Java, *Blume, Zollinger, Reinwardt.*—Var. *oblongifolium.* Island of Aneiteum, *Milne, n.* 298, *M'Gillivray.*—As cultivated in stoves in Europe, this Fern seems to preserve its character of broad, perfectly entire pinnæ. My native specimens, from Aneiteum, have longer and narrower pinnæ, and better accord with Blume's description; and I fear that these come too near some of the forms of Dr. Wallich's *A. fraxinifolium*, our next species.

255. A. (Eudiplazium) *fraxinifolium*, Wall.; caudex ascending copiously fibrous nigro-paleaceous at the apex, stipites aggregated often a foot long brown subrobust below chiefly laxly and deciduously nigrescenti-paleaceous, fronds 1–1½ foot long subcoriaceous firm subnitent brown when dry pinnate, pinnæ 3–11 remote petioled patent 6–10 inches long broadly oblong-lanceolate finely acuminate entirely or very obscurely serrate towards the apex subobliquely cuneate at the base, veins fasciculate twice or thrice dichotomous parallel copious all free (rarely here and there anastomosing), sori copious linear-elongate extending from the costa nearly to the margin, involucres narrow.—*Wall. Cat. n.* 194. *Hook. 2nd Cent. of Ferns, t.* 19. Diplazium, *Wall. Herb.* 1823. *Moore, Ind. Fil. p.* 133. Diplazium elegans (*veins free*), *Hook. in Kew Gard. Misc.* ix. *p.* 343. *C. Wright, in Ringgold and Rogers's Herb. of U. S. Expl. Exp., and in Herb. Nostr.* D. falcatum, *Don?* Aspl. Donianum, *Metten. Asplen. p.* 178.

Hab. Penang, *Wallich.* Sincapore, *Thos. Lobb, n.* 33. Khasya and Assam, *Griffith, Simons, Hook. fil. and Thomson.* Hongkong, *Alexander, Dr. Harland, Wilford, C. Wright.*—This diplazioid Fern, with free venation, has been largely distributed by Dr. Wallich under the name here adopted. The question remains to be determined how far it may be specifically different from an allied Fern, *Oxygonium elegans*, J. Sm. (*Anisogonium*, Pr.), *Diplazium elegans*, Hook. Ic. Pl. t. 939 and 940, or 1st Cent. of Ferns, t. 39 and 40.

256. A. (Eudiplazium) *celtidifolium*, Kze.; caudex erect

scaly at the summit, stipites stout a foot and more long pale brown and as well as the stout rachis very paleaceous with dark brown curly lanceolate very long acuminate scales, fronds broad-oblong acuminated submembranaceous bright green pinnated, pinnæ numerous superior ones rather suddenly smaller and confluent into a large deltoideo-acuminate terminal pinna deeply lobed at the base entire in the upper half, pinnæ horizontal approximate sessile (except the lowest ones) 6–7 inches long from a broad rather unequally truncated base oblong acuminate 1½–2 inches wide moderately serrated at the apex the rest subsinuate or slightly and unequally lobed rarely pinnatifid at the base, veins horizontal in fascicles subdichotomously pinnated outer or inferior branches mostly soriferous, sori short near the costa never extending more than halfway to the margin diplazioid or asplenoid.—*Metten. Fil. Hort. Lips. p.* 75. *t.* 12. *f.* 3, 4. *Asplen. p.* 173. *Kze. Bot. Zeit.* iii. *p.* 285. *Linnæa, p.* 309.

Hab. South America; Venezuela, *Fendler*, n. 152 and 153; *Linden*, n. 76, n. 182, n. 554 (pinnæ very broad and cordate at the base). Ocaña, *Schlim*, n. 616, *Moritz*, n. 276 (with a broad lobe at the inferior base of the pinnæ). Jamaica, *M'Fadyen*, *Purdie*, *Wilson*.—Specimens from the above localities accord well with the description and figures of Mettenius rather than with the character of Kunze; and I fear the plant will prove not to be specifically distinct from the following, *Aspl. grandifolium*, Sw.

257. A. (Eudiplazium) *grandifolium*, Sw.; caudex erect scaly at the summit, stipites erect stout a foot or more long blackish-brown in my specimens epaleaceous, fronds ample 1½–3 feet long ovato-oblong subcoriaceo-membranaceous pinnated pinnatifid at the apex and terminating in a nearly entire acumen, pinnæ horizontally patent petiolated below 4–6 inches long 1–1½ inch broad from a subtruncato-cuneated base oblong often slightly falcate acuminated entire or more or less serrated towards the apex rarely subsinuato-lobate, veins rather distant nearly horizontal subfasciculately pinnated, the branches parallel outer and inferior ones soriferous, sori rather short ½ an inch or less long mostly upon the two outer and inferior branches of the fascicle nearer the costa than the margin diplazioid and asplenioid, involucres when young broad and closely adpressed dark brown in the centre paler at the margin, rachis epaleaceous.—*Sw. Prodr. p.* 130. *Metten. Asplen. p.* 179. *t.* 5. *f.* 3 (*fragment of a pinna*). Diplazium, *Sw. Syn. Fil. p.* 91. *Pr. Tent. Pterid. p.* 113. *t.* 4. *f.* 3. Hemionitis, *Sm. Sw. Fl. Ind. Occ.* iii. *p.* 1605.

Diplaz. brevifolium, *Kze. in Linnæa*, xxiii. *p.* 309 (*fide Metten.*). Diplaz. Schlimense, *Fée*, 8*me Mém. p.* 84.

Hab. Jamaica, *Swartz*, *M'Fadyen*, *Dr. Alex. Prior*, *Wiles* (pinnæ much lobed). Trinidad, *Sir Ralph Woodford*, *Cruger*. Martinique, *Belanger* (too near *A. celtidifolium*). Cuba, *C. Wright*, *n.* 846, 1037 ?: sterile ultimate pinna undivided (not pinnatifid, but resembling the lateral ones). Ocaña, elev. 7000 feet, *Schlim*, *n.* 601 (D. Schlimense, *Fée*). Woods of the Andes of Quito, *Jameson*, *n.* 303; and Bay of Utria, west coast of Darien (pinnules smaller, sometimes slightly auricled, and rarely pinnatifid), *Seemann*. Ilhios, Brazil, *n.* 2474 (*Moricand*).—Swartz, who first distinguished this species, describes it as having the pinnæ "angled at the base," which is, indeed, characteristic enough of many of the specimens and he adds, "Varietas v forsan distincta species frondibus pinnatis, pinnis acutis crenato-serratis *basi retuso-angulatis*." In saying this, he had probably the very dubious *A. celtidifolium* in view. The length and exact position of the sori in relation to the costa and margin do not hold good in the two supposed species, and Kunze's character is quite insufficient to distinguish them.

258. A. (Eudiplazium) *crassidens*, Fée; stipes stramineous brown a span long epaleaceous, frond about a foot long coriaceo-membranaceous dark-green paler beneath opaque pinnated, pinnæ few 10–11 remote shortly petiolate 4 inches long unequally ovato-lanceolate suddenly acuminate obliquely attenuato-cuneate at the base rather coarsely serrated, superior ones subdecurrently sessile, three ultimate ones united into one and hastiform, veins approximate forked or twice or thrice dichotomous more branched in the terminal pinna, sori oblique parallel equal extending from the costa to the margin often diplazioid in the upper pinnæ, involucres brown.—*Hook. 2nd Cent. of Ferns*, *t.* 18. Diplazium crassidens, *Fée*, 8*me Mém. p.* 82. *Metten. Asplen. p.* 151.

Hab. New Granada; Paramos of Ocaña, elev. 10,000 feet, *Schlim*, *n.* 398.—M. Fée established the species upon Schlim's plant from the above locality. It is rather a peculiar-looking species, with a costa dividing the pinnæ into two unequal portions, the upper half the broader, and from the length and regularity of the sori. But it is, perhaps, too near *Aspl. Ramerianum*.

259. A. (Eudiplazium) *juglandifolium*, Lam.; caudex robust erect, stipites fasciculate a foot long sparingly and deciduously setaceo-squamulose, fronds ample 2½–3 feet and more long pinnate subcarnoso-membranaceous (when recent) oblong pinnate, pinnæ numerous sessile free to the summit, the supreme ones only decurrent 6–7 inches long oblong or oblongo-lanceolate entire or only towards the obtuse or moderately acuminated apex obscurely serrated obliquely cuneate at the base, veins subhorizontally patent twice or thrice forked, branches parallel close, sori linear-elongated mostly

diplazioid and generally uniform in length.—*Lam. Encycl.* i. *p.* 307. Diplazium, *Sw. Syn. Fil. pp.* 91, 282. *Willd. Sp. Pl.* v. *p.* 332. *Schk. Fil. p.* 80. *t.* 85. *Hook. Fil. Exot. t.* 100. Aspl. Rœmerianum, *var.* 2, *Metten. Asplen. p.* 762. Filix maxima, etc., *Sloane, Jam.* i. *p.* 82. *t.* 27.

Hab. Jamaica, *Sloane.* Venezuela, *Wagener, Fendler*, n. 498.—A very handsome, and, as far as my observation goes, a rare species, which Mettenius unites, I scarcely think correctly, with *Aspl. Rœmerianum.*

260. A. (Eudiplazium) *Rœmerianum*, Kze.; stipes erect often very stout 1–2 feet long, frond ample membranaceous as long as or longer than the stipes impari-pinnate all petiolate distant numerous 15–17 5 inches to a span and more long broad-oblong lanceolate finely acuminate rather obscurely crenato-serrate towards the apex the rest subsinuate the obtusely or subequally cuneate terminal pinna long-petiolate very large often with two large auricles at the base, veins very distinct horizontally spreading often recurvo-falcate twice forked representing fine black lines, sori linear-elongate arising from the superior veinlet and generally extending from near the rachis to the margin, those of the terminal pinna not unfrequently diplazioid.—*Kze. in Linnæa*, ix. *p.* 62. *Metten. Asplen. p.* 162 (*excl. var.* 2). Diplazium Rœmerianum, *Pr. Tent. Pterid. t.* 4. *f.* 5? (*Mettenius refers here* Aspl. cultrifolium, *Willd. Sp. Pl.* v. *p.* 314 *in part.*)

Hab. Peru, *Poeppig, in Herb. Nostr.* Tarapota, Eastern Peru, *Spruce*, n. 4674. Antioquia, *Jervoise.* Jamaica, *Bancroft.* Cuba, *Linden*, n. 1896.—This has a great resemblance to some states of what I consider *Diplazium juglandifolium*, Sw., of my 'Filices Exoticæ,' t. 100; so much so, that the careful Mettenius has considered it a var. of *A. Rœmerianum.* Of this latter species he justly observes of the veins, that the terminal pinna bears diplazioid sori, all the lateral pinnæ bear asplenioid ones, whereas in our *Aspl.* (Diplazium) *juglandifolium* all the sori are diplazioid, and further, they have less acuminated and more entire and sessile pinnæ.

261. A. (Eudiplazium) *Ottonis*, Kl.; "frond pinnate oblong acuminate, pinnæ lanceolate acuminate membranaceous distant very patent petiolate sessile towards the apex then confluent slightly serrated lower ones inciso-serrate obtuse at the base incisures obliquely acute, upwards obsoletely dentato-serrate, stipites deciduously paleaceous and as well as the rachis tawny compressed glabrous beneath." Diplazium, *Kl. in Linnæa*, xx. *p.* 360. *Metten. Asplen. p.* 180. Asplen. rhoifolium, *Metten. Asplen. p.* 178.—Var. β?; margins of the pinnæ pinnatifid, lobes short broad subfalcate.

Hab. S. America; Merida, *Moritz*, n. 327 (*Klotzsch, in Herb. Nostr.*). Caracas, *Linden*, n. 534 and 1027 (A. rhoifolium, *Metten.*). Ocaña, *Schlim*, n. 496, elev. 4–5000 feet. Cuba, *C. Wright*, n. 1036 (pinnæ broad at the base, lobato-pinnatifid below the middle, and auricled on both sides). Tropical Africa, Angrama, *Barter, in 2nd Niger Exped.* n. 83.—If I am correct in referring hither my specimens from the above localities of this species, it is very variable in the margins of the pinnules, yet has a different habit from *Aspl. grandifolium*, and the pinnæ are constantly narrower, with more parallel sides, so as to be narrow-oblong and more gradually acuminated. The sori, too, are more numerous, with narrow involucres. Tropical African specimens seem to be identical with the South American, but the sori are longer and more parallel. The slightly lobed margins of the pinnæ in Dr. Klotzsch's sample before me become more pinnatifid in what I have ventured to consider a variety of this. But, indeed, so polymorphous are the pinnæ in the diplazioid *Asplenia*, that one may well be allowed to plead ignorance of the precise limits of the species.

262. A. (Eudiplazium) *Lechleri*, Mett.; stipes elongated (2–3 feet) stout subulato-squamose at the base black or pale brown, frond ample (3 feet and more long) coriaceous pinnate, pinnæ a foot and more long 2½–3 inches wide oblong rather finely acuminated serrated only at the apex the base cuneato-rotundate slightly oblique shortly petioled, costa prominent beneath, veins copious fasciculate subhorizontally patent branched or rather pinnated from near the base the branches extending to the slightly thickened margin, the two inferior or outer ones bearing the very elongated diplazioid dark-brown sori, intermediate branches rarely soriferous or imperfectly so.—*Metten. Fil. Lechler. p.* 16. *t.* 2. *f.* 10 (*fragment only; venation incorrect*). *Asplen. p.* 170.

Hab. Peru: St. Gavan, *Lechler, in Herb. Nostr.* n. 2269 (stipes and rachis pale brown); Mount Guayrapurima, near Tarapota, Eastern Peru, *Spruce*, n. 4760 (stipes and rachis dark brown).—This must be a magnificent as well as a most distinct species, of which only a single pinna was known to Mettenius. Our largest pinnæ measure 14 inches long!

263. A. (Eudiplazium) *Lobbianum*, Hook.; caudex (in one specimen) suberect and clothed with black subulate scales, stipites aggregated 6–12 inches scaly only at the base, fronds oblong-ovate 1–1½ foot long subcoriaceo-membranaceous pinnate, pinnæ pinnatifid at the apex, pinnæ 20 or more horizontally petiolate 3–5 inches long subfalcate from a truncated and subauriculated base oblong acuminate more or less serrate subhorizontally patent, veins fasciculate twice or thrice dichotomous, sori solitary or geminate linear subuniform neither extending to the costa nor the margin.—*Hook. 2nd Cent. of Ferns, t.* 17.

Hab. Java, *Thos. Lobb.* Marianne Islands, *Carmichael.* Luzon, *Cuming*, n. 199.—My Java plant is the one figured in the Second Century of Ferns, and I think I am correct in referring to it Captain Carmichael's from the Marianne

Islands. I possess a Fern from Hongkong (*Wilford*), which I can hardly distinguish from it, but the terminal pinna is more entire, yet less so than in *A. fraxinifolium*, to which I might otherwise have referred it.

264. A. (Eudiplazium) *striatum*, L.; caudex elongated thick woody clothed with the stout bases of former years' stipites and large stout radicles black-scaly at the summit, stipites subaggregated 1–1½ foot long lurid-brown paleaceous at the base with firm ovato-lanceolate black glossy scales, fronds 1–1½ rarely 2 feet long ovate acuminate broad at the base (hence subdeltoid) submembranaceous pinnate pinnatifid at the summit; pinnæ numerous 5–6 inches long horizontal petiolate broad-lanceolate often finely acuminate deeply about halfway to the costa pinnatifid, lobes ovate subfalcate obtuse or rarely subacute entire or more or less serrated, superior base truncate its lobe longer so as to be subauriculate; the acuminated apices of the pinnæ serrated or subentire, superior pinnæ confluent acute, veins distant fascicled laxly pinnate in each lobe, sori linear sometimes solitary and confined to the lowest veinlet on the superior base of a fascicle and then curved forming an oblique single series on each side the costa of the pinnæ (then often diplazioid), less frequently shorter straight sori are on all the veinlets in the lobe (as figured by Plumier), sometimes the sori are confined to a few of the superior veinlets in a lobe, and there are all intermediate grades.—*Linn. Sp. Pl. p.* 1539. *Sw. Syn. Fil. p.* 82. *Metten. Asplen. p.* 185 (*judging by the references to Plumier and Hook. Gen. Fil.*). Diplazium, *Pr. Tent. Pterid. p.* 114. *Hook. Gen. Fil. t.* 55. *f.* 3. A. Shepherdi, *Spreng. Fil. Man.* 231. *t.* 17. *f.* 5, 6* (*according to Mettenius, and supposing his references to Raddi's* Aspl. ambiguum *and to* Diplaz. coarctatum, *Lk.* be correct). *Metten. Fil. Hort. Lips. p.* 75. *Asplen. p.* 164. Aspl. Caracasanum, *Willd. Sp. Pl.* v. *p.* 338. *Metten. Aspl. p.* 165. *t.* 5. *f.* 17 (*smaller pinnæ and narrower fronds*). Diplaz. chlororachis, *Kze. Fée, Gen. p.* 213 (*according to Mettenius*). Asplenium ambiguum, *Raddi, Fil. Bras. p.* 38. *t.* 54 (*larger, and with copious sori on nearly all the lobes of the pinnæ, which the author considers the more perfect state of the plant*), and *t.* 54 *bis* (*which Raddi represents as the younger state, with two series of sori along the*

* Moore refers *A. Shepherdi* of Spreng. to *Diplazium radicans*, Sw., a bipinnate species.

costa of the pinna), *not* ambiguum, *Sw.*—Var. *β. lonchophyllum;* pinnæ narrower and very finely acuminated. Diplazium lonchophyllum, *Kze. in Linnæa*, xiii. *p.* 141. xviii. *p.* 633 (*not Kze. in Bot. Zeit.*). *Fée*, 8me *Mém. p.* 215. *Liebm. Fil. Mex. p.* 102. D. acutale, *Fée, Gen. Fil. p.* 215 (*Mett.*). D. inæquilaterum, *Liebm. Fil. Mex. p.* 103 (*in Herb. Nostr.*). Aspl. Schiedei, *Metten. Asplen. p.* 165.—Filix pinnulis latioribus dentatis minor, *Plum. Fil. p.* 15. *t.* 18, *and p.* 16. *t.* 19.

Hab. Martinique, *Plumier*. West Indies and tropical S. America, probably universal, on the authority of almost all collectors and botanical travellers. I must confine myself in regard to localities principally to such as, in my herbarium, bear numbers which have been distributed with specimens, and which are so far authority for what I would refer to this species. West Indies: Cuba, *Linden*, n. 1898; *C. Wright*, n. 1035. Brazil, *Gardner*, n. 46 and 169. Rio, *M'Gillivray*, n. 187. River Marañon, *Spruce*, n. 3911. Illinois, *Moricand*, n. 2309. St. Sebastian, *Mr. Fox*, F 5. Tarapota, Eastern Peru, *Spruce*, n. 4681, 4755, and 4758: smaller. *A. Caracasana*, Willd. Venezuela, *Fendler*, n. 128 and 129 *β.* Tovar, *Moritz*, n. 176; *Jurgensen*, n. 668; *Moritz*, n. 176 and 366.—Var *β. lonchophyllum*. Mexico, Vera Cruz, *Linden*, n 64; *Galeotti*, n. 6289. Tabasco, *Linden*, n. 1498; *Liebmann*, (Dipl. inæquilaterum, *Liebm.*), *Leibold* (*Kze. in Herb. Nostr.*).—The *Aspl. striatum* of Linnæus has been greatly misunderstood, the authority for the species being the very exaggerated figure of Plumier. I have done my best to bring correct synonyms under it, and really, making allowance for variations which are common to Ferns in general, it is a species as readily distinguished as almost any of the genus. Raddi's figures are eminently characteristic.

265. A. (Eudiplazium) *arboreum*, Willd.; caudex "erect ¼ of an inch thick" (*Mett.*) (8 feet high and 3 inches thick, *Willd.*), stipites a span and more long lurid-green paleaceous at the base with black broad-lanceolate scales, fronds 1–1½ foot high ovato-lanceolate firm-membranaceous pinnated pinnatifid at the apex, pinnæ numerous very patent petiolate 4–5 inches long from an obliquely cuneate base truncate and distinctly auricled above, excised beneath, oblong-acuminate rarely subfalcate obtusely dentate or towards the base subpinnatifid with very short subserrated rounded lobes, veins subfasciculato-pinnate each fascicle corresponding with a lobe or tooth the superior basal veinlet alone soriferous, sori linear curved single or geminate forming two series close to the costa but not extending to the margin, 3–5 sori in the auricle. —*Willd. Sp. Pl.* v. *p.* 320. Diplazium, *Pr. Tent. Pterid. p.* 114. Dipl. auriculatum, *Kaulf. En. Fil. p.* 183. D. rigescens, *Kze. Bot. Zeit.* iii. *p.* 283. A. semihastatum, "*Kze. Herb.*" *Metten. Asplen. p.* 162. *t.* 4. *f.* 17 (*seems to be a small state of this, judging from the figure and description*). Diplazium, *Moore, Ind. Fil. p.* 166.—Var. *β. pinnulatum;* auricle of the

inferior pinnæ quite free forming a distinct cuneato-obovate sessile pinnule with two series of sori, fronds more firm and subcoriaceous.—Var. γ. *obtusum*; characters of the preceding var. but pinnæ shorter and obtuse.—Aspl. semihastatum, *var.* obtusum, *Metten. l. c. p.* 163. *t.* 4. *f.* 18. Diplaz. angustifrons, *Pr. Metten. Asplen. p.* 164. *Moore, Ind. Bot. p.* 166. Aspl. hymenodes, *Metten. Asplen. p.* 163. *t.* 5. *f.* 18, 19 (*Mettenius refers to this*, Aspl. bipartitum, *Spr., not Willd.*, Diplazium, *Kze.* Aspl. pellucidum, *Lam. var.* β, *and Plum. t.* 61 ?).

Hab. S. America: New Granada, Ocaña, elev. 8–10,000 feet, *Schlim, n.* 65 and 370. Caracas, *Linden, n.* 122. Venezuela, near Caripe, *Moritz, n.* 101. Brazil, *Kaulfuss*. Ocaña, *Schlim, n.* 602. Cuba, *n.* 1034; *C. Wright.*—Var. β. *pinnulatum*. Jamaica, *M'Fadyen*, and at "Coldspring Gap," *Purdie.*—Var. γ. *obtusum*. Jamaica, *Herb. Nostr.*—The ordinary form of this, as described by authors, and seen in Moritz's Columbian specimens, quoted by Mettenius, so closely resembles our previous species, *A. striatum*, that, except in the narrower fronds, more cuneate base of the pinnæ, their more prominent auricle and scarcely pinnatifid—sometimes only serrated—margins, I do not see how it is to be distinguished. But some of my specimens, especially from Jamaica, have from 1 to 12–13 of the lower pinnæ with a free auricle or distinct pinnule, yet the passage to the ordinary auricle may among these be traced. The caudex described by Willdenow is perhaps by mistake given as arborescent, but in *A. striatum*, from a portion of one preserved by Mr. C. Wright, the caudex is erect and stout, though far from "octopedalis, diametro tripollicari." Under the var. *obtusum* of his *Aspl. semihastatum*, Mettenius says, "Transitus ad *A. auriculatum* non vidi;" but my copious specimens lead me to entertain a different opinion.

266. A. (Eudiplazium) *cultratum*, Metten. (not Gaud.); caudex stout erect crowned with black subulate scales, stipites 4–6 inches long with black scales at the base, "frond coriaceous glabrous oblong pinnate, pinnæ ovate-oblong falcate acute obtusely serrate, the superior base truncate and auricled inferior rotundato-obtuse, lowest ones petiolate, middle ones sessile, superior ones adnate with their inferior base, those at the extremity coadunate into a pinnatifid apex, stipes above rachis and petioles clothed with short conico-cylindrical pellucid horizontal down, veins internal." Diplazium, *Pr. Epimel. Bot. p.* 84. Asplenium, *Metten. Asplen. p.* 179. Diplaz. extensum, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 407, *in part*.

Hab. Luzon, *Cuming, n.* 199. Lower pinnæ rather long-petiolated, 2 inches long, ⅓ of an inch broad.—This is one of several species of Mr. Cuming, with different numbers, which Mr. J. Smith has included under the name of *Diplaz. extensum*. He had this, *n.* 199, probably, more especially in view when he says of three of the numbers which he brings under that species, "not unlike *Diplazium grandifolium* of the West Indies."

267. A. (Eudiplazium) *sylvaticum*, Pr.; caudex stout erect woody sending down very stout unbranched vermiculate fibres, paleaceous at the summit with rather large almost black subulate scales, stipes a span to a foot long stout scaly only at the base, fronds 1½–2 feet long ovato-lanceolate submembranaceous pinnated pinnatifid at the apex, pinnæ below petiolate horizontally patent from a generally truncated base elongate oblongo-lanceolate acuminate subfalcate entire or subsinuate or subpinnatifido-lobate rarely subauriculate at the superior base, lobes rounded entire or serrated, veins fasciculato-pinnate in the lobed pinnæ each fascicle corresponding to a lobe, generally all soriferous, sori very slender frequently diplazioid—*Pr. Rel. Hænk.* i. *p.* 42. *Metten. Aspl. p.* 179. Diplazium, *Sw. Syn. Fil. p.* 92. *Willd. Sp. Pl.* v. *p.* 352. *Schk. Fil. p.* 80. *t.* 85 *b.* Anisogonium, *Pr. Hook. Gen. Fil. t.* 56 *B.* Microstegia, *Pr.* D. Hilsenbergianum, *Pr.* (*J. Smith refers here* Aspl. maximum *and* A. latifolium, *Don, and* A. diversifolium, *Wall.*). Diplaz. bulbiferum, *Brack. Fil. U. S. Expl. Exp. p.* 141. *t.* 18. *f.* 1. A. extensum, *J. Sm. in Hook. Bot. Journ.* iii. *p.* 407 *in part.*

Hab. Mauritius, *Bojer, Carmichael, Sieber*, n. 29. Ceylon, *Gardner*, n. 1349 (some specimens with pinnæ quite entire). Feejee Islands, *Brackenridge, Milne*, n. 69 and 306. Isle of Samar, *Cuming*, n. 333, and Malacca, n. 338. Java, *Zollinger*, n. 583.—This approaches the larger specimens of *A. Schkuhrii* (which I suspect is often mistaken for it), but the pinnæ are either entire or only divided at the margin into shallow lobes or large teeth, and the caudex is very different in the two.

268. A. (Eudiplazium) *mutilum*, Kze.; "frond membranaceous opaque green glabrous, stipes 1½ foot long lurid-purplish clothed at the base with largish brown ovato-lanceolate scales, frond 2–3 feet long broad-lanceolate acuminate pinnated pinnatifid at the apex, pinnæ numerous obliquely patent (on a petiole 2 lines long) 6¼ inches long 1 inch wide (*e basi truncatæ, medio in petiolum productæ vel inferiore subtruncatæ, superiore truncato-rotundatæ, longius in petiolum decurrente*) elongato-oblong rather obtuse or acuminated at the attenuated apex pinnato-lobate, the lower ones subdistant smaller, lowest ones 3½ inches long, lobes subrotundate unequally denticulato-serrate, costules (standing at an angle of 70°), veins manifest 5–6 on each side, lowest anterior ones diplazioid extending nearly from the costa to the sinus of the lobes, the rest costular and contiguous to the costules not extending to the margin, involucres membranaceous."

Mett.—Diplazium mutilum, *Kze. Flora*, 1839. *Beibl.* i. 37. *Metten. Asplen. p.* 180.

Hab. "Bahia, *Luschnath.*"—"Proximum *Dipl. sylvatico*, W. Schk. t. 85 *b*, quod vero glabrum, pinnis abbreviatis, dentatis, sorisque rectis differt."—*Kze.*

269. A. (Eudiplazium) *tomentosum*, Mett.; caudex small tortuous knotty scaly above sending down numerous wiry branched roots, stipites tufted 4–5 inches to a span long hispid especially towards the base with subulate blackish-brown scales, fronds 6–10 inches long firm-coriaceous oblong-ovate acuminate pinnate pinnatifid at the apex, pinnæ approximate 1½–2¼ inches long ½–¾ of an inch wide sessile from an obliquely truncated auriculated base linear-oblong acute rarely subfalcate pinnatifid about halfway down to the rachis, segments acute subfalcate entire or toothed at the apex, lower pairs of pinnæ reflexed superior one serrated, segments of the acumen toothed at the apex, veins pinnated in each lobe or segment simple or one-forked, sori few 1–4 in each segment often diplazioid, involucres brown, membrane erose at the margin.—*Metten. Asplen. p.* 182 (*excl. syn.*). Diplazium, *Bl. En. Fil. Jav. p.* 192. Asplen. argutum, *Fée, in* 8*me Mém. p.* 53. *t.* 24. *f.* 2. Aspl. marginatum, *Wall. Cat. n.* 2204 *and* 2209 (*according to Mettenius and Moore*). *Mettenius adds* D. Lasiopteris, *and* Allantodia deflexa, *Kze., and* Aspl. frondosum, *Wall. Cat. p.* 63, *Add.* Diplazium deflexum, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 407. Asplen., *Mett.*

Hab. Java, *Blume, in Herb. Nostr.* Malacca, *Cuming*, n. 386, *Sir W. Norris.* Khasya, *Griffith.* Mergui, "in damp, dark, cavernous places, on banks, near watercourses. When fresh it has a pale metallic lustre, which is lost in drying."—A well-marked species. Fée's figure represents a small specimen. The fibrous roots are singularly stout and wiry.

270. A. (Eudiplazium) *elatum*, Mett.; "caudex erect paleaceous with blackish-brown lanceolate scales, stipes 9 inches long dirty-reddish sparingly clothed with similar scales ending in a patent bristle, frond deep green rigid-membranaceous 1½ foot long broadly elliptical-lanceolate acuminate pinnate, pinnæ numerous laxly disposed patent 6½ inches long 8 lines wide petiolate from the inferior obliquely truncated or rounded base, superior truncated and attenuated into a petiole linear gradually caudato-acuminate slightly but coarsely crenate serrated at the apex, lowest ones remote a little abbreviated, crenatures abbreviated subtruncated repand, costules distinct diverging from the costa at an angle of 70°,

nerves on each side 2–3, the lowest reaching above the margin of the sinus, lowest anterior sori diplazioid subcontiguous with the costa extending to the middle of the segments, the rest 1–2 on each costule, involucre gradually passing into the parenchyme." *Metten. Asplen. p.* 180.—"Diplazium, *Fée, Gen. p.* 214. D. acuminatum, *J. Sm. Cat. Cult. Ferns.*"

Hab. Ceylon, "*Gardner*, *n.* 34."

271. A. (Eudiplazium) *Thwaitesii*, A. Br.; caudex long creeping black rooting, stipites scattered 4 inches to a span long and as well as the main rachis woolly with crisped hairs mixed with lanceolate membranaceous scales, fronds a span to a foot long ovato-lanceolate acuminate membranaceous pinnate pinnatifid at the apex, pinnæ 1½–3 inches long approximate sessile horizontal lanceolate obtuse straight deeply almost to the rachis pinnatifid with short-oblong obtuse lobes toothed at the apex, veins pinnated simple or forked, sori in two oblique rows in each lobe rather small linear-oblong, involucres pale-brown membranaceous convex eroso-ciliate and diplazioid but far more generally asplenioid, costæ and veins above subglandularly and very sparsely hirsute.—*A. Braun, Ind. Hort. Berol.* 1857. *Metten. Asplen. p.* 183. *Hook. 2nd Cent. of Ferns, t.* 45. Diplazium, *Moore.*

Hab. Ceylon, *Gardner*, *n.* 1343; *Thwaites.*—A remarkable and well-defined species, in its long, creeping, subterranean, black caudex, and the densely tomentose and paleaceous stipites and main rachises.

272. A. (Eudiplazium) *porrectum*, Wall.; caudex erect or ascending, stipites tufted 6 inches to a foot long subcastaneous, fronds 8–10 inches to 1–1½ foot long deltoid-oblong or pyramidal pinnate, pinnæ horizontal numerous 4–6 inches long petiolate or sessile and confluent at the acuminated pinnatifid apex, from a broad truncated and auricled or generally quite hastate base (having a distinct auricle above and below) linear-lanceolate obtuse or acuminate, lower ones more or less deeply pinnatifid, intermediate ones obtusely dentate, uppermost ones entire at the margins, veins patent pinnated in the auricles the rest once or twice forked, sori linear elongated confined to the superior or basal veinlet and extending its whole length or on the two outer ones, mostly diplazioid, involucres membranaceous when young.—*Wall. Cat. n.* 204 (*afterwards, at p.* 63, *altered to* A. multisoratum, *Wall.*, (*not* 224, *Wall., which is* A. protensum, *from Mauritius, and is*

afterwards, at p. 63, *altered to* A. polyodon, *Wall.*) ***Metten. Asplen. p.*** 177. *t.* 5. *f.* 1, 2. Aspl. auriculatum, ***Wall. Herb.*** 1823, *and Cat. n.* 204, *as synonym to* A. porrectum. Diplazium, *Pr. Tent. Pterid. p.* 113. Aspl. phanerotis, *Kze. in Bot. Zeit.* iv. *p.* 194.

Hab. Penang and Singapore, *Wallich, Thos. Lobb, Sir Wm. Norris.* "Chapadong Hill," *Wall. in Herb. Nostr.* (Aspl. soboliferum, *Wall. MS.*). Malacca, *Cuming*, n. 387. Borneo, *Motley, Wallace.*—My numerous specimens are very uniform in their character, and remarkable for the pyramidal (rather than deltoid) form, broad at the base and gradually narrowing to the apex: the lower pinnæ are invariably pinnatifid.

273. A. (Eudiplazium) *Prescottianum*, Wall.; caudex?, stipes a foot and more long tawny-brown, frond 1½ foot and more long subdeltoideo-ovate subcoriaceo-membranaceous acuminate pinnate, pinnæ 5–6 inches long ½ an inch or little more wide from an obliquely cuneate and rather long petiolated base linear-lanceolate acuminate very patent, lower ones dentato-pinnatifid, intermediate ones with 3–4 of the superior basal lobes cut down to the costa (almost pinnules), superior ones with a solitary auricle at the base above, terminal ones short entire confluent into a lanceolate pinnatifid acumen, veins patent pinnate each fascicle corresponding with a lobe dichotomous most of the branches bearing diplazioid sori of unequal lengths.—*Wall. Cat. n.* 235. Diplazium, *Moore, Ind. Fil. p.* 156 (*name only*).—Var. β; superior pinnæ only with a solitary prominent auricle.—Var. γ; pinnules destitute of auricle or any deep lobes.

Hab. Singapore, *Wallich, Thos. Lobb* (var. β). Penang, *Sir Wm. Norris* (var. γ).—Dr. Wallich's specimens appear to constitute a good species, yet too near *A. sylvaticum*. I am disposed to consider the two vars. noticed above to be forms of the same.

274. A. (Eudiplazium) *Schkuhrii*, Mett.; caudex (only present in our var. β) slender long-creeping subterranean branched compactly scaly at the apices of the branches, stipites a span and more long pale-brown scaly when young distant, fronds a span to 1½ foot long subdeltoideo-ovate acuminate membranaceous green pinnate pinnatifid at the apex, pinnæ 3–7 inches long nearly an inch wide sessile very patent from a short subcuneate base lanceolate or elongato-oblong much acuminated deeply often nearly to the rachis pinnatifid with ovate or oval acute or obtuse more or less serrated or entire lobes, veins pinnated in each lobe, veinlets simple rarely forked obliquely patent nearly all soriferous, sori rarely

diplazioid.—*Metten. Asplen. p.* 182. Diplazium, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 407. *Hook. Kew Gard. Misc.* ix. *p.* 344. Aspl. ambiguum, *Schk. Fil. t.* 75 (*not Sw. nor Schk. Fil. t.* 75 *b*). Dipl. Malaccense, *Pr. Epimel. Bot. p.* 86. *Fée, Gen. Fil. p.* 213. *t.* 17 *D.* 1. Aspl. decussatum, *Wall. Cat. n.* 2208, *in part*. A. polymorphum, *Wall. Cat. n.* 230 (1, *from Nepal*). Diplazium congruum, *Brack. Fil. U. S. Expl. Exped. p.* 141. *t.* 18 (*very faithful*).—Var. *β*; smaller, pinnæ 1–2 inches long less deeply pinnatifid.

Hab. East Indies Nepal, *Wallich*. N. W. India, *Edgworth, Strachey and Winterbottom, n.* 3. Loochoo, *Alexander*. China, *Alexander, Braine*. Hongkong, *Bowring, Hance*. Harbour Island, Japan (?), *C. Wright*, K. *Herb. of U. S. Pacif Expl Exp. in Herb. Nostr.* Feejee Islands, *Brackenridge*. Malacca?, *Cuming, n.* 389, 390, and Moulmein, *Parish* (very large and more numerous pinnæ).—Var *β*. China, *Braine*: sent with the common form. Korea, *Wilford, n.* 905, and Formosa, *n.* 472. -Like so many other Ferns, this species is very variable, especially in size, yet I think the above synonyms are correct.

275. A. (Eudiplazium) *Sorzogonense*, Pr.; caudex stout horizontal densely covered with long subulate falcate black-brown scales, stipites scattered distant stout 4 inches to a span long purplish-brown shaggy with crinite curly scales deflexed towards the base, fronds 1–2 feet long subcoriaceous dark blackish-green when dry ovato-lanceolate pinnate pinnatifid at the apex, pinnæ numerous horizontal sessile or nearly so 2½ to nearly 6 inches long from a truncated base oblong elongato- or linear-oblong acuminate pinnatifid serrated towards the apex, segments more or less deep oblong obtuse or retuse subfalcate entire or serrated at the apex, veins pinnated in each lobe, veinlets simple obliquely patent mostly all soriferous, sori linear lower ones only diplazioid, rachis and costæ especially beneath deciduously crinite or hairy.—*Pr. Rel. Hænk.* i. *p.* 45. *Metten. Asplen. p.* 185. Diplazium, *Pr. Tent. Pterid. p.* 114. *Epimel. Bot. p.* 86. *J. Sm. in Hook. Journ.* iii. *p.* 408. Hypochlamys, *Fée, Gen. Fil. p.* 200. D. acuminatum, *Bl. En. Fil. Jav. p.* 193? D. Smithianum, *Kze. Bot. Zeit.* vi. *p.* 195.—*β. majus*; basal pinnæ again pinnated.

Hab Luzon and Sorzogon, *Hænke*. Java, *Blume*. Leyte, *Cuming, n.* 301. Bhotan, *Griffith, n.* 2807. Sikkim, elev. 8–10,000 feet, *Hook fil. and Thomson, n.* 210.—Var. *β* Foot of Moohoo Mountain, Borneo, *Hugh Low*.—The fronds a good deal resemble those of *A. Schkuhrii*, but they are larger and stronger, and the very stout caudex and stipites are quite shaggy with long, brown, subulate, almost black scales.

276. A. (Eudiplazium) *lobulosum*, Wall.; caudex erect

small densely clothed with the bases of old stipites paleaceous, stipites tufted 5–6 inches long, fronds broad-lanceolate acuminate membranaceous a span to 12–14 inches long pinnated pinnatifid at the apex, pinnæ on slender petioles 1½–3 inches long very patent broad-lanceolate falcate sharply acuminated truncated and auricled at the superior base, inferior base excised the margin more or less deeply lobed, lobes as well as the auricles spinulosely inciso-serrate, costa slender flexuose vein-like, veins in oblique fascicles corresponding to each lobe dichotomous lowest superior branch only soriferous, sori mostly asplenioid linear neither attaining the costa nor the margin.—*Wall. Cat. n.* 210. *Metten. Asplen. p.* 163. Diplazium, *Pr.* Diplaz. longifolium, *Moore, Ind. Fil. p.* 141.

Hab. Nepal, *Wallich*. Simla, *Edgworth* (in one of these specimens the auricle forms a distinct, semiovate pinnule).—This species is, I believe, very distinct, with much of the habit of *Aspl. striatum*, but easily distinguished by the spinuloso-serrated or incised lobes of the pinnæ.

277. A. (Eudiplazium) *speciosum*, Bl.; "fronds pinnate pinnatifid at the apex coriaceous nearly glabrous, pinnæ opposite shortly petiolate elongato-lanceolate very acuminate truncated at the base deeply pinnatifid, segments oblong obtuse sharply serrated, rachis and stipes tetragonous paleaceo-hirsute."—*Metten. Asplen. p.* 185. *t.* 5. *f.* 5 (*portion of a pinna*). Diplazium, *Bl. En. Fil. Jav. p.* 193.

Hab. "Java, *Blume*, *Zollinger*.—Differs from *Diplaz. acuminatum*, Bl. (A. Sorzogonense, *Pr.*), in the coriaceous, elongated pinnæ, with the segments sharply serrated."

278. A. (Eudiplazium) *Cubense*, Hk.; caudex from the thickness of a crow's to a goose-quill subhorizontal or ascending densely rooting with coarse fibres paleaceous at the summit, stipites aggregated 4 inches to a span long slender stramineous, fronds 4–6 or 8 inches long bright-green membranaceous ovate or broad-lanceolate acuminate pinnate pinnatifid at the apex, pinnæ not numerous patent 1½–2 inches long petiolate lanceolate sharply inciso- and submucronately serrate acute or obtuse oblique cuneate below petiolate superior base with an acute auricle, lowest pair of pinnæ with the auricle free to the base or again pinnate with lowest pinnules again with a free auricle so that the frond then becomes subtripinnate, veins pinnate pellucid simple or forked, sori copious elongated linear oblique inferior ones diplazioid, involucres dark-brown membranaceous. (TAB. CCVII.)

Hab. Near Monte Verde, Eastern Cuba, *C. Wright*, n. 1032.—I find no species either among *Euasplenium* or *Diplazium* which will accord with this, and the few specimens I do possess are very variable, as may be seen from our figures where the two extremes are represented.

279. A. (Eudiplazium) *costale*, Sw.; caudex (in a small specimen a foot long brown scaly at the base), stipes stout sulcate, frond ample pinnate pinnatifid at the apex coriaceo-membranaceous, pinnæ petiolate remote 6–14 inches long 3–7 inches broad from a truncated base ovate or oblong acuminate more or less deeply pinnatifid rarely at the base again pinnate with sessile obtuse pinnules, segments 1–3–4 inches long obtuse or generally in the larger and longer segments acute and even finely acuminate generally a little falcate especially at the apex which has an upward curvature entire at the margins or more or less serrated, veins in the undivided pinnæ or segments obliquely patent with regard to the costa or costule simple or once or twice forked the veinlets parallel not spreading superior veinlet in the entire pinnæ generally only, in the segments frequently all, soriferous, sori approximate to the costæ linear elongated asplenioid or diplazioid, involucres half or three-quarters of an inch long or more, main rachis above and the costæ and costules beneath deciduously chaffy and sometimes glanduloso-villous.—*Sw. Syn. Fil. p.* 82 *and* 276. *Willd. Sp. Pl.* v. *p.* 339. *Metten. Asplen. p.* 186. Diplazium, *Pr. Tent. Pterid. p.* 114. *Moore.* Aspl. costatum, *Poir.* Aspl. macrophyllum, *Metten. Fil. Chil. p.* 16, *not Sw.* Diplazium, *Desv. Pr. Tent. Pterid. p.* 114. *t.* 3. *f.* 14. Aspl. Desvauxii, *Metten. Asplen. p.* 181. *t.* 5. *f.* 4.

Hab. Jamaica, *Swartz*, *Wilson*. New Granada, *Linden*, *n.* 1035 *and* 535. Triana, *n.* 28. Antioquia, *Jervise*, *Purdie*. Ecuador, Forest of Archedona, Andes of Quito, *Jameson*, *J. P. Couthony* (*ex Herb. D. C. Eaton*). Peru, *Pæppig*; St. Gavan, *Lechler*, *n.* 2158; Tarapota, Eastern Peru, *R. Spruce*, *n.* 4336 (some of the pinnæ are 7 inches broad, and the segments 3¼ inches long, 1½ wide, sinuses 3 inches deep, the petiole an inch long), *n.* 4339, 4684, and 4685. It is only by means of a series of specimens from Jamaica as well as from the continent of S. America, that I am able to satisfy myself that *Aspl costale* of Swartz and *A. Desvauxii* of Mettenius are one and the same plant, so very variable is the form of the pinnæ. A specimen of Mr. Spruce, marked n. 4339, is particularly instructive. It is small but perfect, young, yet bearing sori, the frond 15 inches long, 9 broad, ovate, acuminate, pinnated below with five acuminated pinnæ, above pinnatifid, the segments gradually smaller and more obtuse—in short, a counterpart of what many of the pinnæ are on the larger fronds, which latter probably attain a length of 3–4 feet or more. Often many of the upper pinnæ gradually become more entire Some of the fronds have a nearer resemblance to Plumier's figure of *A. striatum*, L., than what is almost universally considered

that species, and yet the two are very distinct. See for dubious species of this section the foot-note below.*

(*Fronds bi-tripinnate.*† *India, etc., excluding S. America.*)

280. A. (Eudiplazium) *deltoideum*, Pr.; "fronds deltoid very glabrous bipinnate, pinnæ lanceolate acuminate alter-

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* *Dubious species supposed to be of this (pinnated) section of* Eudiplazium:—*A. biserratum*, Pr. Del. Prag. i. p. 177. *Diplazium*, Presl, Tent. Pterid. p. 4. f. 2. Metten. Asplen. p. 164. Brazil.——*Diplazium? falcatum*, Liebm. Fil. Mex. p. 101. Metten. Asplen. p. 164. Mexico.——*D. elongatum*, Fée, Gen. Fil. p. 215. Metten. Asplen. p. 164. Mexico.——*Asplenium hemionitides*, Roxb. Crypt. Pl. p. 36. Metten. Asplen. p. 164. Malay Islands. Moore refers this to *Diplazium tomentosum*, Bl., I know not how far correctly.——*Aspl. mixtum*, Roxb. Crypt. Fil. p. 37. Metten. Asplen. p. 164. Amboyna. Moore refers this to *Diplaz. sylvaticum*.——*A. flexuosum*, Wikstrom. Moore places this under *Diplaz. radicans*. Guadeloupe.——*A. longifolium*, Don, Nepal, is *Diplaz. longifolium*, Moore.——*Meniscium cristatum*, Desrouss. Martinique.——*Diplazium anthraxacolepis*, Fée, 8me Mém. p. 84. Metten. Asplen. p. 165. Mexico.——*Diplazium crenulatum*, Liebm. Fl. Mex. p. 102. Mexico.——*Asplenium grande*, Fée, 8me Mém. p. 82. Metten. Asplen. p. 166; is *Aspl. achilleæfolium*, according to Moore.——*Diplazium nitidum*, Cav.; "foliis pinnatis, pinnulis obtusis, basi amplioribus et subcordatis subnitidis."—*Cav. in Ann. de Cienc. Nat.* xix. *p.* 66. *t.* 48. Metten. Asplen. p. 177.——*Asplenium elasticum*, Fée, Gen. p. 196. Metten. Asplen. p. 176. India.——*Asplenium serrulatum*, Roxb. Crypt. Pl. p. 36. Metten. Asplen. p. 177. Malay Islands.——*A. crenatum*, Roxb. Crypt. Pl. p. 36. Metten. Asplen. p. 177. Malay Islands.——*A. varium*, Roxb. Crypt. Pl. p. 37. Metten. Asplen. p. 177. Amboyna. Moore calls this *Diplazium Roxburghii*.——*Aspl. vacillans*, Kze. Bot. Zeit. vi. p. 172. Metten. Asplen. p. 177. Java. Apparently allied to *Aspl. pallidum*.——*Aspl. Cataractarum*, Bl. En. p. 177. Metten. Asplen. p. 177. Java.——*Aspl. grande*, Sw. Syn. Fil. p. 77. Willd. Sp. Pl. v. p. 311. Metten. Asplen. p. 177. *Aspl. macrophyllum*, Cav. Marianne Islands.——*Aspl. sorbifolium*, Willd. Sp. Pl. v. p. 312. Metten. Aspl. p. 177. *Diplazium*, Pr.——*Diplazium fraxineum*, Don, Prodr. Fl. Nep. p. 12. Metten. Asplen. p. 177. Nepal.——*D. Callipteris*, Fée, Gen. p. 214. Metten. Asplen. p. 179. Cuba.——*D. proliferoides*, Bory, in Belang. Voy. Bot. p. 38. Metten. Asplen. p. 179. Mauritius.——*D. curvatum*, Desv. Mém. Soc. Linn. vi. p. 280. Metten. Asplen. p. 179. Jamaica.——*D. curvatum*, Desv. l. c. p. 281. Metten. Asplen. p. 179. Peru.——*D. tenue*, Desv. l. c. p. 281. Metten. Asplen. p. 179. Tropical America.——*D. Bantamense*, Bl. En. p. 191. Metten. Asplen. p. 179. Java.——*D. lineolatum*, Bl. En. l. c. Metten. Asplen. p. 179. Java.——*D. petiolare*, Pr. Epim. Bot. p. 86. *Asplenium*, Metten. Asplen. p. 180. Luzon.——*D. extensum*, J. Sm. Cuming, n. 407, *ex parte* (*Mett.*). When two or more species are distributed under one and the same number, it becomes extremely difficult to know which the author of the name had particularly in view. ——*A. multiflorum*, Roxb. Crypt. Pl. p. 37. Metten. Asplen. p. 184. Malay Islands.——*A. Japonicum*, Thunb. Fl. Jap. p. 334. Sw. Syn. Fil. p. 82. Willd. Sp. Pl. v. p. 336. Kze. Bot. Zeit. vi. p. 524. Metten. Aspl. p. 184. "Fronds pinnate, pinnæ acute inciso-pinnatifid serrulate," Th. Japan.—No doubt this list of dubious individuals of the present section might be greatly increased, but too much space has already been given to many which will perhaps ever remain, if worth recording, under a head of "incertæ species."

† If the species of authors of the pinnate section of *Eudiplazium* be difficult

nate or opposite, pinnules sessile oblong obtuse acutely serrated, sori oblong small oblique with the costa, stipes glabrous." *Pr. Reliq. Hænk.* i. *p.* 47. *t.* 7. *f.* 2.—*Metten. Asplen. p.* 184. Diplazium, *Pr. Tent.* D. ebenum, *J. Sm. in Hook. Journ. Bot. p.* 408 (*Cuming's n. 29 only*), *not Metten. Asplen. p.* 187. D. melanopodium, *Fée, 8me Mém. p.* 85. *Metten. Asplen. p.* 187.

Hab. Luzon, *Hænke*. Stipes 7 inches long. Frond 7–11 inches, *Cuming*, n. 29. —If in a perfect state, this is one of the smallest of the compound *Eudiplazia*, and my Luzon specimens of Cuming's n. 29 quite agree with this; one specimen is a little larger and copiously soriferous, the other is about the same size as Hænke's plant, but sterile. Stipes and rachis slender, lurid-blackish, caudex short, thick, ascending, crinite with subulate scales.

281. A. (Eudiplazium) *arborescens*, Metten.; "caudex creeping densely clothed with blackish ovate acuminated scales, stipes dirty-stramineous below villous with lanceolate scales above glabrous, frond 2–3 feet long coriaceous" (rather submembranaceous) "opaque-green glabrous ovate or oblong acuminate bipinnate, pinnæ shortly petiolate lower ones subovate superior oblong-lanceolate, pinnules lower ones shortly petiolate from a truncated base on each side subauricled, approximate auricles overlapping, oblong acuminate pinnatifidly incised serrated at the apex, superior ones with a broad adnate base oblong rather obtuse serrated, secondary veins in the laciniæ generally with the branches undivided, lowest tertiary veins generally with an asplenioid sorus directed towards the costa of the segments rarely diplazioid, sori elongate, involucre membranaceous entire."—*Mett. Fil. Hort. Lips. p.* 78. *t.* 13. *f.* 19, 20. *Asplen. p.* 186. Diplazium, *Sw. Syn. Fil. p.* 92. *Willd. Sp. Pl.* v. *p.* 354. D. nigro-paleaceum, *Kze. in Linnæa*, xxiv. *p.* 270. Asplen. diplazioides, *Hook. et Arn. Bot. Beech. Voy. p.* 107. Diplaz.

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of determination, how much more so those of the more compound kinds, where, besides the variations of individuals, there are the variations to be considered of the pinnæ, pinnules, and segments of one and the same large frond, of which fragments only generally exist in the herbarium! Swartz has two species in this section, *Dipl. esculentum* (an *Anisogonium*) and *D. arboreum*, both from the East Indies, mistaking, however, a pinna of the former for an entire frond, as we are assured by Willdenow, who adds two new species from S America. Mettenius enumerates 49! the majority of them, however, apparently unknown to him. But the most laboured of his, no doubt, accurate definitions, unless taken from entire specimens, which scarcely exist in herbaria, are unavailable for practical use, and I think it better to confine myself to such authentic specimens as exist in my herbarium, or are generally acknowledged.

Arnottii, *Brack. l. c. p.* 144. *Metten. Aspl. p.* 186.—Var. *melanocaulon;* stipes dark-coloured. D. melanocaulon, *Brack. Fil. U. S. Expl. Exp. p.* 144. *Metten. Asplen. p.* 186.

Hab. Bourbon (Herb. Mus. Par. in Herb. Nostr.), *Carmichael.* Mauritius, *Mettenius.* St. Helena, *Cuming*, n. 427; *J. D. Hooker.* Diana's Peak, *Seemann*, n. 2641. Coral Islands and Oahu, *Diell, Beechey.* Pitcairn's Island, *Cuming*, n. 1389. — Var. *β.* Feejee Islands, *Brackenridge*, and Aneiteum, *Milne and M'Gillivray*, n. 66, 107, 510, 320, and 356; *Harvey.* — This probably holds the same place in the Old World that *A. dubium* does in the New. It has, however, few well-marked, distinguishing characters, and the segments of the pinnules vary in length and breadth. Too closely allied also to *A. polypodioides*.

282. A. (Eudiplazium) *polypodioides*, Mett.; "caudex erect clothed with lanceolate long acuminato-setaceous scales" (*Mett.*), stipes usually stramineous or pale-brown while young and primary and secondary rachises clothed with copious long black lanceolato-subulate spreading scales, frond ample coriaceo-membranaceous bi-(tri?-)pinnate pinnatifid at the acuminated apices and at those of the primary pinnæ, primary pinnæ distant petiolate from a broad base ovato-lanceolate acuminate 6–12 inches long, pinnules sessile or subpetiolate 2–4 or 5 inches long ½ to ¾ of an inch wide from a truncated base oblong acuminate pinnate ⅔ or ¼ of the way to the costa with closely approximated oblong sometimes slightly falcated segments more or less serrated at the margin, veins approximate simple or rarely forked often all soriferous, sori oblong convex at length confluent often diplazioid, involucres pale-brown membranaceous often breaking irregularly.—*Metten. Fil. Hort. Lips. p.* 78. Diplazium, *Bl. En. Fil. p.* 104. (Unless I greatly misunderstand this species, of which my authentic specimen is from Java, Dr. de Vriese, the following synonyms may be here adduced):— Aspl. frondosum, *Wall. in Herb. Nostr.* Diplazium, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 108. D. brevisorum, *J. Sm. in Hook. Bot. Journ.* iii. *p.* 408 (fronds almost black-green, sori almost allantodioid). Asplenium, *Mett. Asplen. p.* 192. D. ebenum, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 408. Asplenium, *Metten. Asplen. p.* 187. A. caudatum?, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 408 (dark-green, segments of the pinnules in some cases an inch long, rachis dark purple-black. Mettenius, Asplen. p. 189, refers this to *Aspl. cyatheæfolium*, Bory, Diplaz., *Pr.*, a species with which I am unacquainted). Aspl. ambiguum, *Hook. et Arn. Bot. of Beech. Voy. p.* 107.

Hab. Java, *Blume, De Vriese, Thos. Lobb.* Singapore, Luzon, *Cuming*, n. 288

(Dipl. frondosum, *Wall., J. Sm.*), *n.* 20 and 153 (D. brevisorum, *J. Sm.*), *n.* 158? (D caudatum, *J. Sm.*), *n.* 159 (D. ebenum, *J Sm.*). Mishmee, *Wallich, Griffith.* Tonghoo, Moulmein. *C S P. Parish, n.* 103. Ceylon, *n.* 1061, 1062, and 1066 (quite according with *Dipl. brevisorum*, J. Sm.), *Gardner, n.* 1352 and 1353, *Mrs. Gml. Walker*, and *Thwaites, n.* 3332 (probably a distinct species, with some of the pinnules decurrent, the sori distant, elongated, and slightly curved) Sikkim, Khasya, *n.* 199 and 201, *Hook. fil. and Thomson* (scales of the stout stipes rich tawny-brown). Nilghiri, *Thomson, Dr. Wight.* Simla, *Col. Bates.* Kumaon, elev. 8000 feet, *Strachey and Winterbottom, Dr Grant.* Bhotan, *Booth, Griffith, n.* 2806. Kashmir. Sandwich Islands, Oahu, *Beechey.* Pitcairn's Island, *n.* 8. Madagascar, *Boivin* (pinnæ smaller, and segments narrower) — Perhaps too near the plant I have considered *Aspl. arborescens*, and evidently a widely-distributed species over India and the Malay Islands, and probably of the Pacific Islands.

283. A. (Eudiplazium) *asperum*, Mett.; "fronds ample bipinnate membranaceous glabrous, inferior pinnules shortly petiolate lanceolate acuminate subcuneato-truncate at the base pinnatifid, segments subfalcate oblong serrulate at the apex, sori crowded minute (but distinct), rachis and stipes asperous."—Diplazium, *Bl. En. Fil. Jav. p.* 195. Asplenium, *Metten. Asplen. p.* 190.

Hab. Java, *Blume, in Herb. Nostr., Thos. Lobb.*—The author observes of this species, "Priori (*Aspl. polypodioides*) valde affine, sed distinctum laciniis obtusis et soris haud confluentibus, stipite aspero" I perceive, however, no difference, save in the asperous and, indeed, almost prickly stipes and rachis, especially at the back; but in several of my specimens, which I consider true *polypodioides*, the rachis is occasionally asperous, and it would be better, perhaps, to consider this a variety of that species.

284. A. (Eudiplazium) *dilatatum*, Hook.; caudex?, stipes stout 2 feet and more long below paleaceous with lanceolate acuminate scales, frond ample membranaceous or coriaceo-membranaceous tripinnate pinnatifid at the apex, primary pinnæ remote more or less sometimes long petiolate often 1–2 feet long once or twice pinnate pinnatifid at their apices, pinnules extremely variable in size and outline and even 6 inches long horizontally from ½ an inch to 1 or 1½ inch wide sessile or petiolate from a usually truncated or cuneato-truncate broad base oblong acuminate often finely so varying in the margins even on the same pinna from entire to serrated pinnatifid in various degrees sometimes to the costa and near the base often pinnated, segments oblong or ovate acute or obtuse frequently subfalcate entire or serrate, veins fascicled in the entire or nearly entire becoming pinnated in the lobes, veinlets simple or forked free rarely uniting, sori near the costa narrow-linear not extending to the margin those on the lower veinlets often diplazioid.—D. dilatatum, *Bl. En. Pl. p.*

194. *Metten. Asplen. p.* 186: Aspl. diversifolium, *Wall. Cat. n.* 203 (*not Bl.*). Diplaz. extensum, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 408 (*Cuming's n.* 170 *and* 349, *only*). *Metten. Asplen. p.* 187. D. affine, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 407.

Hab. Ceylon, *Mrs. Genl. Walker* (pinna nearly two feet long, with all the pinnules deeply pinnatifid), *Gardner*, *n.* 1058 (very heteromorphous), *n.* 1059 (pinna 2 feet long, all the pinnules finely acuminate, lobato-pinnatifid, 6–8 inches long, 1 wide), *n.* 1060 (two large pinnæ, one with pinnules all entire, the other with pinnules pinnatifid), *n.* 1248 (four pinnæ on a portion of a rachis with rather pinnatifid pinnules), *n.* 1358 (specimen with superior pinnæ 6–8 inches long, deeply pinnatifid, five pinnæ below with all entire pinnules). Nepal, *Wallich*, *n.* 203. Khasya and Himalaya, and Sikkim, *Griffith*, *Simons*, *Hook. fil. and Thomson* (pinnules as variable as in the Ceylon specimens). China, Samsu Bay, *Alexander*. Hongkong, *Bowring*, *Hance*, *Col. Urquhart*, *n.* 29, 30, 53, and 60 (in various states between simply pinnate and copiously bipinnate). Formosa, *Wilford*, *n.* 476. Moulmein, *Parish*, *n.* 133 (very fine specimens). Malacca, *Griffith*. Society Islands, *Bidwill* (a straggling plant, with small, generally obtuse pinnules, possibly a different species). Luzon, *n.* 167 (one specimen with superior pinnæ pinnatifid, inferior ones again pinnated, pinnules subhastate and all serrated; another large pinna with pinnules all pinnatifid), and 170, and Isle of Bohol, *Cuming*, *n.* 349. Java, *Blume*, *in Herb. Hook.* Hongkong, top of the ridge, *Col. Urquhart*, *n.* 29, 60, and 53, in various states between pinnate and copiously bipinnate.—From Ceylon, and Mauritius especially, I have described a simply pinnated diplazioid Fern, which I take to be the *Diplazium sylvaticum* of Swartz and Willdenow, and Schk. Fil. t. 85, b (see our n. 267); but I am disposed to consider the present plant to be always different, and, when perfect, bipinnate. This is very abundant in Ceylon, but never, that I know of, found in Mauritius. It is also a very common plant in India and the Malay Peninsula, and, no doubt, Archipelago, etc.; and it is very different from any other of the *Eudiplazium* group. It has, however, a great deal the habit of *Aspl.* (Anisogonium) *esculentum*, but that has anastomosing venation. An authentic specimen of Blume's *A. dilatatum* in my herbarium exactly corresponds with this, a name which I therefore willingly adopt. The variation of the pinnules in different parts of the same specimen, renders it impossible to draw a satisfactory character which shall include all their variations.

285. A. (Eudiplazium) *melanochlamys*, Hook.; caudex ?, stipes (upper portion only) 4–5 lines wide compressed and angled dirty-brown, frond ample "6 feet in length" widely spreading subcoriaceo-membranaceous deep green a little paler beneath bipinnate, primary pinnæ from 5–12 inches long remote broad-oblong acuminate 3–4 inches broad at the base, secondary pinnæ or pinnules rarely petiolate sessile and often decurrent on the pinnæ towards the apex of the frond and crenato-pinnatifid and then small 1–2 inches long, on the lower pinnæ 2–3 inches long from a rather broad base ½ an inch to 1 inch wide oblong acuminate deeply pinnatifid often nearly to the rachis, segments oval-oblong obtuse serrated approximate having narrow sinuses, veins pinnated in the larger segments, veinlets simple or forked, sori narrow-

linear frequently diplazioid very conspicuous in the smaller and scarcely pinnatifid pinnules forming two oblique lines or series on each side the costules, in the segments of the deeply pinnatifid pinnules two compact series of lines extending from the costule nearly to the margin, involucres coriaceous narrow glossy purple-black quite ebeneous seen under a microscope minutely punctated, rachises all smooth pale-brown.

Hab. Lord Howe Island, S. Pacific, ravine of Mount Ligberd, *M'Gillivray*, n. 702, and *Milne*, n. 36.—Unwilling as I am to add needlessly to the amount of supposed species of Diplazioid *Asplenia*, of the decompound group, the peculiar nature here of the involucre alone seems to afford an excellent character, which, instead of being of a thin, membranaceous, tender character, easily rupturing and easily separating from the frond, is firm, almost coriaceous, glossy, permanent, and exhibiting that peculiarly purple-black ebeneous character so common to the stipites and rachises of species of *Adiantum*. Something of that nature of involucre is seen in our *Aspl. pulicosum*, n. 290, from Ecuador, but here they are unusually elongated, and look like black-written characters on the under side of the frond. In other respects our present plant might pass for some of the common forms of *A. dubium* among *Eudiplazia* of the New World, and among *A. arborescens* and *polypodioides* of the Old.

286. A. (Eudiplazium) ***vestitum***, Pr.; caudex ?, stipes stout tawny-brown and as well as the whole length of the rachises copiously paleaceous with small crisped scales, the very base with large (½ of an inch long) dark-brown ovato-lanceolate acuminated ones, fronds 2–3 feet long ovato-lanceolate shortly acuminate membranaceous dark green bipinnate, pinnæ petiolate remote 10 inches long pinnatifid at the apices, pinnules 10–12 distant long-petiolate horizontally patent 2½–3 inches long 1 inch broad oblong obtusely or suddenly acute pinnatifid about halfway down to the costa quite truncated at the base lobes shortly obtuse or somewhat retuse entire gradually smaller and forming teeth or serratures at the apex and on the superior pinnæ as well as on the inferior oblong obtuse lobes of the pinnatifid extremity, veins pinnated in the lobes, veinlets simple below forked towards the apex, sori confined to the lower ones linear frequently diplazioid, involucres slender brown.—Diplazium, *Pr. Epimel. Bot. p.* 87. Asplenium, *Hook. 2nd Cent. of Ferns, t.* 46. Diplazium extensum, *J. Sm. in Hook. Bot. Journ.* iii. *p.* 407 *according to the number* 336, *Cuming, from Samar, name only*).

Hab. Samar, Philippine Islands, *Cuming*, n. 336.—This appears to me to be a very distinct diplazioid *Asplenium*, and is one of six separate numbers of Mr. Cuming, which Mr. J. Smith has included under his *Dipl. extensum*.

287. A. (Eudiplazium) ***virescens***, Mett.; "frond obliquely subtriangular acuminate membranaceous glabrous pale green

bipinnate at the base, pinnatifid at the apex, lower pinnæ alternate from an unequal base oblong more remote, pinnules sessile subtruncate at the base slightly curved subelliptical obtuse subauriculate serrulate, sori oblong minute with few capsules in two series close by the veins of the pinnules and the costule of the laciniæ, rachises slender flexuose as well as the stipes of moderate length, the latter stramineous furnished with two obtuse-angled glands towards the apex (abortive pinnæ) sparingly and minutely paleaceous."—*Kze. in Bot. Zeit.* vi. *p.* 537 (*sub* Diplaz.). *Metten. Asplen. p.* 191.

Hab. Japan, "*Goring*, n. 95, 104."—If a true diplazioid Fern, this is perhaps the most northern of any known. I am quite unacquainted with it.

(*Fronds bi-tripinnate.—South American.*)

288. A. (Eudiplazium) *Franconis*, Metten.; "stipes 10–12 inches, frond subcoriaceous glabrous dark green above glaucous-green beneath (not so in Dr. Liebmann's specimen in my herbarium) 2 feet long 10-12 inches wide broad-lanceolate acuminate bipinnate pinnatifid upwards pinnato-pinnatifid confluent at the apex, pinnæ alternate patulous 6–7 inches long 2 inches wide petiolate lanceolate long-acuminate acute, pinnules alternate patulous 1½ inch long 4 lines wide inequilateral lanceolate subfalcate, lowest ones petiolate obliquely cuneate at the base sessile with the superior base, inferior base decurrent, the superior ones adnate towards the apex gradually confluent, the apex more or less acutate, pinnatifid above only duplicato-crenate, segments falcato-lanceolate obtuse or truncato-obtuse serrate, lowest segment of the superior margin larger than the rest, the sinuses acute towards the middle of the pinnule scarcely incised, costa and partial rachis margined, primary rachis and stipes canaliculate in front convex on the back, veins pinnated, venules simple or forked, sori curved crowded (scarcely) lowest ones double, stipes towards the base clothed with lanceolate membranaceous brown scales, rhizome subterraneous subvertical cæspitose."—*Liebm. Fil. Mex. p.* 104 (*sub* Diplaz.). *Metten. Asplen. p.* 166. *t.* 5. *f.* 30 (*fragment only of a pinna*).

Hab. Mexico; Oajaca, *Liebmann, in Herb. Nostr.*, *Galeotti*, n. 6483 (*Metten.*), *Jurgensen*, n. 732.—My specimen of this from the author is 1½ foot long, with every appearance of being only a primary pinna. Specimens in my collection which I take to be the same as this, with smaller pinnæ and pinnules and segments, but more compound, often tripinnate, are from Jamaica, *Purdie*, and *Wilson*, n. 503; and Peru, Archedona, *Jameson*.

289. A. (Eudiplazium) *dubium*, Mett.; caudex?, "frond

ample membranaceous or subcoriaceous opaque-green having on the costa and veins beneath as well as on the ramifications of the caudex scattered ferruginous scales finely tomentose at length glabrous bipinnate, primary pinnæ rather distant 1 foot long on a petiole 3–4 lines long oblong acuminate, secondary pinnæ approximate or subapproximate rectangularly patent 2 inches long 7–8 lines wide from an oblique truncated base oblong acuminate subpinnatifid with the lobes truncated obtuse or crenate, lowest one shortly petiolulate, superior ones adnate at length confluent, costules standing at an angle of 70°, veins at an angle of 20–25° 1–5 on each side, lowest superior ones extending to a tooth in the sinus of the lobes, inferior ones a little above the margin of the sinus, sori contiguous to the costule almost reaching the margin, lowest anterior ones diplazioid, involucre membranaceous entire narrow." *Metten. Asplen. p.* 187.—Diplazium, *Lk.* Aspl. radicans, *Schk. p.* 70. *t.* 76, *not Sw.* (A. rhizophorum *on the plate*). Diplazium, *Pr. Hook. Gen. Fil. t.* 55 *B. f.* 4 (*not Sw.*). *Willd. Sp. Pl.* v. *p.* 337. Diplazium ambiguum, *Raddi, Fil. Bras. p.* 41. *t.* 58.

Hab. Brazil, *Raddi, Sellow (Klotzsch, in Herb. Nostr.), Schott and Moricand* (*Mettenius*). Virgin Forests, Organ Mountains: "stem 3–4 feet high," *Gardner*, n. 5937; and Rio, n. 47. Demerara, *Parker* (pinnæ large, 2–3 inches broad, often pinnatifid nearly to the rachis) Eastern Peru; Tarapota, *Spruce*, n. 4124, 4344, and 4682. Mexico, *Liebmann* (A. crenulatum, *Liebm.*), *Jurgensen*, n. 268. Tabasco, *Linden*, n. 1491. New Granada; Antioquia, *Jervise* (this is not "*apice radicans*," but has scaly bulbs in the axils), *Schlim*, n. 495. Caraccas, n. 16, 17; *Linden*, n. 90 (*Miquel*). Venezuela, *Fendler*, n. 146, 147, and 436 (petiole stout, with large black lanceolate scales). Sta. Martha, *Purdie* (pinnæ much acuminated, and as well as the rather acute and narrow segments erecto-patent). West Indies: Jamaica, *Purdie* (one specimen pinnato-pinnatifid) St. Vincent, *Guilding* (Diplaz. radicans, *Hook. Gen. Fil. t.* 55 *B. f.* 4). Guadeloupe, *L'Herminier*. Martinique, *Belanger*, n. 808 and 1008. Cuba, *C. Wright*, n. 547, 847 (only pinnato-pinnatifid), and 1039 Mr. Moore considers, and perhaps justly, that the *Aspl. radicans*, Sw., is the same as our *A. rhizophorum*. If so, the *A. radicans* of Schkuhr and Willdenow (for Willdenow quotes Schkuhr's figure) is very different, and a diplazioid Fern. Yet both these authors refer to Swartz as the author of their species. Schkuhr's plant is, however, represented as a pinnate species, but not as "radicant" at the apex. Corresponding with this figure I possess numerous specimens from tropical America (some pinnate, more numerous ones bipinnate), which I am disposed to bring under this species. These seem quite to correspond with the *Aspl. dubium* of Mettenius, whose name I adopt.

290. A. (Eudiplazium) *pulicosum*, Hook.; caudex?, stipes?, fronds 1½–2 feet long subcoriaceous firm and rigid pale green bipinnate pinnatifid and acuminate at the apex, pinnæ 4–5 inches to a span long petiolate spreading remote oblong or

oblongo-ovate acuminate, pinnules 1–2½ inches long approximated horizontal sessile from a broad truncated base oblong obtuse rarely subacuminate, the smaller serrato-lobate at the margins, the larger ones deeply pinnatifid (except at the apex) more than halfway down to the rachis, segments 4 lines long oblong-parallelogram strongly but unequally and subspinulosely serrated, veins pinnated sunk oblique generally once-forked, sori few distant very small, in the smaller pinnules in two series close to the costa, in the larger ones in two series upon the segments, scarcely a line long prominent lower ones frequently diplazioid always very distant from the margin, involucres small very firm rigid permanent brownish-black, rachises stramineous-brown slightly flexuose, younger ones apparently deciduously subpaleaceous.

Hab. Ecuador, *Jameson*.—The characters of this Fern are too much at variance with all that I know of *Aspl. dubium*, to allow of my uniting it with that. It corresponds, indeed, in the general form of its pinnæ and pinnules, but the colour is peculiarly pale, the texture singularly harsh and rigid, the serratures, though not sharp and elongated, yet are subspinulose, the substance quite opaque, the veins scarcely prominent but subobsolete, the sori distant, few, very short, and small, and the involucres firm and of so brownish-black a colour, that, taken in conjunction with their size, they present the appearance at first sight of fleas arranged in parallel lines; whence the specific name.

291. A. (Eudiplazium) *Klotzschii*, Mett.; "frond ovato-lanceolate tripinnatifid" (tripinnate?), "pinnæ more or less long elongate acuminate, pinnules lanceolate shortly stipitate deeply pinnated coarsely serrated at the apex acuminate gradually smaller upwards, segments coarsely crenato-serrate oblong obliquely truncated at the apex, stipes tall compresso-angled brownish-black flexuose evanescenti-paleaceous, involucres fimbriate." *Metten. Fil. Hort. Lips. p.* 79. *Asplen. p.* 188.—Lotzea diplazioides, *Kl. et Karst. in Linnæa*, xx. *p.* 358.

Hab. Columbia, *Karsten*, n. 23; *Moricand*, n. 431 (*Metten. in Herb. Nostr.*). Venezuela, *Fendler*, n. 148 (sori old) and 149. Cuba, *Linden*, n. 1753.—The involucre is brown, very delicate, and rather strongly reticulated, lax, and when perfect beautifully fimbriated at the margin, which character appears to have induced Dr. Klotzsch to have constituted of it a new genus.

292. A. (Eudiplazium) *flexuosum*, Pr. (not Schrad.); "fronds bipinnate scandent?, pinnules alternate petiolate oblong-lanceolate acuminate horizontally deflexed pinnatifid, segments oblong very obtuse squamulose at the margin lowest ones serrated, rachises tetragonous flexuose pubescent at their

apices, sori oblique." *Pr. Reliq. Hænk.* i. *p.* 46. *t.* 7. *f.* 1.—*Metten. Asplen. p.* 190. Diplazium, *Pr. Tent. p.* 111.

Hab. Valleys of the Cordillera of Peru, *Hænke, Poeppig, Mathews*, n. 1818.—Presl's figure well represents a secondary pinna and a portion of the rachis. The remarkably flexuose or zigzag rachis, giving the plant quite the appearance of a climber, readily distinguishes this. All my three specimens possess this peculiarity.

293. A. (Eudiplazium) *allantodioides*, Metten.; "frond ovato-oblong bipinnato-pinnatifid and bipinnatifid more simple upwards, pinnæ lanceolate falcate acuminate, segments oblong subfalcate truncato-obtuse adpresso-serrate, sori uniseriate, costæ rachis and stipes paleaceous." *Kze.*—Aspl. allantodioides, *Metten. Asplen. p.* 191. Allantodia asplenioides, *Kze. in Linnæa*, ix. *p.* 72. Diplazium, *Pr. Tent. Pterid. p.* 114. *t.* 4. *f.* 4 (*small fragment of a pinna only*).

Hab. Peru, *Poeppig*, "*Allantodia? costalis*, Desv. (Aspl conchatum, *Moore, olim, et Hook*.). præcipue differt stipite rachibusque glabris; *All. australis*, Br.; fronde deltoidea, soris confertis." –The figure, a mere fragment, represents a very common form of segments of a pinna of this group.

294. A. (Eudiplazium) *fusco-pubescens*, Hook.; caudex?, stipes nearly 2 feet long stout dark-coloured (as is the whole plant, looking as if it might have grown in watery places) not paleaceous but fusco-pubescent as are all the rachises on both sides but most so beneath, frond ample 2–3 feet long submembranaceous blackish-green (when dry) tripinnate, primary pinnæ a foot long spreading horizontally broad-oblong petiolate acuminate, secondary pinnæ very shortly petiolate 3–4 inches long horizontal oblong rather obtuse younger or later developed ones pinnatifid with deep narrow oblong more or less lobed or pinnatifid segments, older ones again pinnated especially at the base, pinnules always sessile and adnate and subdecurrent narrow-oblong lobato-pinnatifid, lowest lobes or segments rather large subauriculiform, veins pinnated oblique rather distant, sori few small suboval, involucres bullate thin-membranaceous now and then diplazioid the margin erose, rachis often slightly winged.

Hab. Mount Campaña, near Tarapota, Eastern Peru, *Spruce*, n. 4759. Ocaña, New Granada, in forests, elev. 4–5000 feet, *Schlim*, n. 69? (main rachis stramineous, scarcely pubescent, sori longer; probably a different species).—I cannot refer this to any described *Diplazium*. The specimen is an entire one, with much the habit and ramification, and even the pinnules of *Aspl.* (*Allantodia*, Br.) *umbrosum*; but the whole plant is blackish-green, the involucres are small, and not of a fragile character. Of Schlim's plant I am altogether doubtful, and the

specimen I possess (about 1½ foot long) is probably only a portion of the entire frond; but the size and form of the ultimate pinnules sufficiently correspond.*

D. DIPLAZIUM (*-section*),—*continued* (*see p.* 235).

(Anisogonium-*group.*—*Veins variously anastomosing.*)

* *Fronds ternate.*

295. A. (Anisogonium) *ternatum*, Hook.; caudex short stout radicose, stipites tufted 4–6 inches high, fronds 4–5

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* I give in this note a list of dubious or unknown species of bi-quadripinnate *Eudiplazia* :—*Asplenium polyphyllum*, Pr. Tent. Pterid. p. 108. Metten. Asplen. p. 168. t. 5. f. 23. Manila. This, I think, judging from the figure and description of Mettenius, may be referred to *Aspl. acuminatum*, Hook. and Arn., and of this volume.——*Diplazium falcatum*, Brack. Fil. U. S. Expl. Exp. p. 143. Metten. Asplen. p. 185. Samoan Islands.——*D. diversifrons*, Bory, in Belang. Voy. Bot. p. 39. Metten. Asplen. p. 186. Dendigul.——*D. Mohillense*, Fée, 8me Mém. p. 85. Madagascar.——*D. affine*, J. Sm. in Hook. Journ. Bot. iii. p. 407. Metten. Asplen. p. 187. Luzon. "Cuming, n. 167 and n. 87."——*Asplenium Meyenianum*, Metten. Asplen. p. 189. *Asplenium aspidioides*, "Goldm. Nov. Act. A. C. L. Nat. Cur. xix. Suppl. i. p. 461. Moore, Ind. Fil. p. 114. Manila.——*A. Blumei*, Bergam. Metten. Asplen. p. 189. *Aspl. diplazioides*, Bory, in Belang. Bot. p. 51. *Diplaz. marginatum*, Bl. En. p. 195. *Allantodia aspidioides*, Bl., de Vriese. Java, Borneo, Ceylon.——*Diplazium prionophyllum*, Kze. Bot. Zeit. vi. p. 194. Metten. Asplen. p. 190. Java.——*Microstegia? Kunzeana*, Pr. Epim. Bot. 92, 260. *Diplazium*, Kze. Java.——*Diplazium speciosum*, Brack. Fil. U. S. Expl. Exp. p. 145. Samoan Islands.——*D. microphyllum*, Desv. Mém. Soc. Linn. vi. p. 281. t. 7. f. 1. Metten. Asplen. p. 190. East Indies.——*D. serrulatum*, Desv. Mém. Soc. Linn. vi. p. 282. Metten. Asplen. p. 190. Bourbon.——*D. varium*, Gaud. in Freyc. Voy. Bot. p. 232. Metten. Asplen. p. 190. Molucca Islands.——*Asplenium bipinnatum*, Roxb. Crypt. Pl. p. 37. Metten. Asplen. p. 37. Amboyna.——The following are from South America:—*Diplazium camptocarpum*, Fée, 8me Mém. p. 84. Metten. Asplen. p. 167. Mexico.——*Aspl. distans*, Fée, Gen. p. 198. Metten. Asplen. p. 167. Mexico.——*A. angustatum*, Pr. Metten. Asplen. p. 167. t. 5. f. 22. Brazil. Moore refers this to Lamarck's and his *A. sulcatum*, and constitutes of it the var. β, *attenuatum*, *A. attenuatum*, Klfs. *Aspl. sulcatum*, Lam., is, I fear, itself a doubtful species, which Mettenius refers, with a query, to *Aspl. cuneatum*. By other references, especially to Plumier, t. 40, it would appear that Mr. Moore considers *A. angustatum* to be a form of *A. auritum*, our var. *rigidum*.——*A. aspidiiforme*, Fée, Gen. p. 179. Metten. Asplen. p. 168. Mexico. Galeotti, n. 6483.——*A. myapterum*, Fée, 8me Mém. p. 82. Metten. Asplen. p. 168. Mexico. ——*A. alienum*, Metten. Fil. Lechl. fasc. ii. p. 18. Asplen. p. 169. Peru. "Differt ab *Asplenii* habitu Polystichoideo congruis segmentis secundariis æquilateris, etc." ——*A. obtusum*, Metten. Asplen. p. 187 (not Fil. Hort Lips.). "*Diplazium*, Lk. *D. expansum*, Kl. in Linnæa, xx. p. 360. *D. truncatum*, Pr. Cuba, *Linden*, n. 1745. Peru, *Lechler*. Venezuela, *Funck and Schlim*, n. 605 *ex parte*."——*Diplaz. umbrosum*, Willd. Sp. Pl. v. p. 353. "Bl. En. p. 194." Metten. Asplen. p. 188. Caraccas. "Java"?——*D. amplum*, Liebm. Fil. Mex. p. 104. Metten. Asplen. p. 188. Mexico.——*D. Féei*, Schaffn. in Fée, 8me Mém. p. 85. Metten. Asplen. p. 188. Mexico.——*Asplen. Wageneri*, Mett. Ind. Sem. Hort. Lips. 1856. Asplen. p. 188. *Diplaz.*, Hort. Berol. Caraccas.——*Diplaz. pedatum*, Pr. Rel. Hænk. i. p. 46. Metten. Asplen. p. 188. *Diplaz.*, Willd. Sp. Pl. v. p. 354. *D. Hænkeanum*, Pr. Tent. Pterid. p. 114. *Aspl. striatum*, Metten. Fil. Hort. Lips. p. 78 (not of others). South America.

inches long subcoriaceo-membranaceous ternate, lateral pinnæ alternate 1–3 inches long shortly petiolate dimidiato-ovate acute erecto-patent, terminal one 4–5 inches long ovato-lanceolate finely acuminate rather long-petiolate cuneate at the base all of them sharply serrated chiefly in their upper half, veins oblique slender black fascicled 3–4 times dichotomous lower superior ones generally anastomosing so as to form a series of elongated areoles nearer the costa than the margin, sori very long linear those of the veins that form the areoles asplenioid meeting at the apex of the areole and continuing diplazioid along the vein formed by the union of the veins that constitute the areole, involucres (young) broad membranaceous satiny.—*Hook. in 2nd Cent. of Ferns, t.* 51 (*not Pr.*). Diplazium ternatum, *Liebm. Fil. Mex. p.* 100. *Metten. Asplen. p.* 162.

Hab. Mexico, Dept. Oaxaca, *Liebm. in Herb. Nostr.*—This is a very peculiar-looking plant, very uniform in the three fronds in my possession, and bearing copious, though not very advanced sori. It is quite unlike any other *Asplenium* with anastomosing venation.

** *Fronds pinnated, the less fully developed ones often simple.*

296. A. (Anisogonium) *Kunzei*, Mett.; caudex short stout erect, stipites 6–14 inches long stout and as well as the rachis and costa and often the primary veins beneath furfuraceo-paleaceous, fronds subcoriaceous blackish-green from 10–14 inches long or more subspathulato-elliptical acute cuneate or attenuated at the base entire or irregularly and acutely sublobate at the margin or broad ovato-truncate at the base and variously sometimes deeply pinnatifid with a subtriangular and acute entire apex or deltoideo-ovate and pinnated in the lower half with two pairs of nearly opposite sessile lateral pinnæ oblong 6–10 inches long 2 inches broad shortly and rather bluntly acuminated truncated at the base, the upper half or nearly so 8 inches long broad triangular acute deeply pinnatifid with large horizontal segments of the same shape as the pinnæ, veins numerous horizontally patent fascicled several times dichotomous copiously anastomosing even from the base where they form large costal areoles, sori diplazioid attached to all the veins continuous and anastomosing with them, involucres membranaceous brown singularly crispato-undulate.—*Metten. Asplen. p.* 182. *Fil. Hort. Lips. p.* 74. *Asplen. p.* 171. Diplazium pinnatifidum, *Kze. in Linnæa*, ix. *p.* 72. *Anal. Pterid.*

p. 25. *t.* 16 (*very good as to the pinnatifid form*). Anisogonium, *Pr. Tent. Pterid. p.* 116. *t.* 3. *f.* 6. *Fée, Gen. p.* 219.

Hab. Pampayaco, Peru, *Pœppig.* Mount Guayrapurima, near Tarapota, Eastern Peru, *Spruce*, n. 4686. Archedona, Ecuador, *Jameson.*—This fine species seems peculiar to tropical western America, where it assumes very different forms; from those with entire fronds, tapering at the base, through various pinnatifid states to pinnate with a very broad base and triangular circumscription. Kunze's figure represents one of the intermediate states, not at all pinnate. The largest pinna on one of our specimens is nearly 11 inches long, and the superior margin is distinctly and obtusely lobed, the inferior quite entire.

297. A. (Anisogonium) *cordifolium*, Mett.; caudex rather stout erect throwing out wiry roots, stipites 6 inches to a foot and more long paleaceous especially towards the base, fronds 6–8 inches to a foot long subcoriaceous simple and oblong acuminate entire cordate at the base and there subpinnato-lobate with oblong very obtuse segments and often proliferous, or pinnate, pinnæ 3–5 lateral ones horizontally patent sessile or nearly so oblong-ovate acuminate subobliquely cuneate at the base 3–4 inches long, terminal one very large long-petiolate 6–8 inches long acuminate cordate at the base, veins patent dichotomously fasciculate anastomosing towards the margin, sori very long and narrow often diplazioid and anastomosing, involucres very narrow brown membranaceous.—Aspl. integrifolium, *Metten. Asplen. p.* 171. —1. Fronds entire or nearly so. A. cordifolium, *Metten. Fil. Hort. Lips. p.* 74. *t.* 12. *f.* 6. Diplazium, *Bl. En. Fil. Jav. p.* 190. *Hook. Ic. Pl. t.* 184. Aspl. ovatum, *Wall. Cat. n.* 195. Oxygonium, *Pr. J. Sm.* Callipteris, *J. Sm.*— 2. Fronds pinnate, pinnæ 3–5. Diplaz. integrifolium, *Bl. En. Fil. Jav. p.* 190. Diplazium, *Hook. Ic. Pl. t.* 936. Anisogonium, *Pr.* Diplazium Zollingeri, *Kze.* (*fide Metten.*).

Hab. Java, *Blume, in Herb. Nostr., Zollinger, Lobb.* Singapore, *Wallich*, n. 195; and Penang, *Sir Wm. Norris.* Isle of Leyte, *Cuming*, n. 307.—A very handsome species, of which the entire-fronded state seems much more abundant than the pinnated.

298. A. (Anisogonium) *alismæfolium*, Hook.; caudex short rather stout and as well as the fascicled stipites 3–5 or more inches long paleaceous with lanceolato-subulate crisped scales, fronds subcoriaceous dark blackish-green from a span (and then oblong-lanceolate acuminate acute at the base) to 1 or 1½ foot long and then ternate or pinnate with 7 or more pinnæ of which the lateral ones are 6–8 inches long by

2 broad oblong-lanceolate acuminate slightly falcate entire obliquely subcuneate at the base, terminal pinna the largest 10 inches long, veins obliquely patent fascicled 2–3 times or more forked anastomosing towards the margin, sori copious narrow-linear frequently diplazioid often extending from the costa to near the margin free (not anastomosing) parallel, involucres extremely narrow.—Diplazium alismæfolium, *Pr. Rel. Hænk.* i. *p.* 49. *t.* 8. *f.* 3 (*frond simple*). Callipteris *and* Oxygonium, *J. Sm.* Aspl. Cumingii, *Metten. Fil. Hort. Lips. p.* 74. *t.* 12. *f.* 5. *Asplen. p.* 170. Ochlogramme, *Pr. Epim. Bot. p.* 94. Pteriglyphis elegans, *Fée, Gen. Fil. p.* 220. *t.* 18 *B, I.*

Hab. Malay Islands, Sorzogon, *Hænke* Luzon, *Cuming*, n. 116.—A very fine and distinct species, bearing simple and pinnated fronds, often from the same caudex.

299. A. (Anisogonium) *elegans*, Mett.; caudex short erect with copious wiry roots, stipites tufted 5 inches to a span long scaly at the base, fronds subcoriaceous from 6–10 inches long and then entire broad-lanceolate much acuminated and serrated towards the apex, or hastate with two spreading obtuse lobes at the base, or 1–2 feet and more long pinnated with several lateral (4–10) subopposite oblong-lanceolate sessile pinnæ often a foot to 16 inches long 2 inches wide subcuneate at the base, terminal one long-petiolate larger than the rest, veins subhorizontally spreading fasciculate twice or thrice or more forked here and there anastomosing towards the margin, sori linear-elongated near the costa but not extending to the margin, involucres rather narrow.—*Metten. Fil. Hort. Lips. p.* 74. *t.* 11. *f.* 5. Diplazium, *Hook. Ic. Plant. t.* 939, 940. Callipteris *and* Oxygonium, *J. Sm.* (*names only*). Anisogonium, *Pr.* Anisog. grossum, *Pr. Epim. Bot. p.* 93.

Hab. Malay Islands; Luzon, *Cuming*, n. 276; and Leyte, n. 315 (large form, *Anisog. grossum*, Pr.). Borneo, *H. Low.* Labuan, *Thos. Lobb.* Allied to *A. alismæfolium*, but very different. Here the pinnæ are serrated at the apex, and the veins sparingly anastomose, and only near the margin. This anastomosing venation is the only character that I know of to separate it from *Aspl.* (Eudiplazium) *fraxinifolium* of Wallich, our n. 255.

*** *Fronds bi-tripinnate.*

300. A. (Anisogonium) *esculentum*, Pr.; caudex stout erect "subarborescent 3 feet high" very scaly at the summit, stipites tufted stramineous-brown angled, fronds ample broad oblong acuminate bipinnate below pinnatifid, in the middle

simple pinnate, terminal pinna large pinnatifid at the base, primary lateral pinnæ 1½–2 feet long petiolate horizontal oblong acuminate, pinnules distant horizontal sessile or shortly petiolate from a broad truncate frequently hastate base oblong gradually acuminated 4–6 inches long varying in breadth entire or serrated or variously and regularly lobed or pinnatifid at the margin most so at the base, the lobes obtuse serrated, veins very patent fasciculate pinnate the branches uniting with those of the opposite fascicle (as in *Nephrodium*, Pr., among *Aspidieæ*), sori copious on the veinlets rather short linear decussate often diplazioid and at length confluent, involucres narrow brown membranous, costæ beneath often squamuloso-furfuraceous.—*Pr. Rel. Hænk.* i. *p.* 45. *Metten. Asplen. p.* 174. Diplazium, *Sw. Syn. Fil. p.* 92 *and* 285. *Willd. Sp. Pl.* v. *p.* 354. Hemionitis, *Retz, Obs.* vi. *p.* 38. Anisogonium, *Pr. t.* 116. Digrammaria, *Fée.* Diplazium Serampurense, "*Spr. Fil. Nov. Man. p.* 231. *t.* 17. *f.* 1." Callipteris, *Fée.* Anisogonium, *Pr.* Aspl. pubescens, *Metten. Fil. Hort. Lips. p.* 78. *t.* 11. *f.* 3. Diplazium, *Link.* Microstegia, *Pr.* Diplazium Malabaricum, *Spreng. J. Sm. Kze.* D. umbrosum, *Moritz.* Aspl., *Metten. Fil. Hort. Bot. Lips. t.* 11. *f.* 4. Aspl. ambiguum, *Sw. Syn. Fil. p.* 81 *and* 343. *Schk. Fil. p.* 69. *t.* 75 *b* (*very faithful, venation excepted*). *Willd. Sp. Pl.* v. *p.* 343. Digrammaria ambigua,* *Pr. Tent. Pterid. p.* 117. *t.* 4. *f.* 12, 17. *Hook. Gen. Fil. t.* 56 *C.* Microstegia, *Pr. Epim. Rheede, Hort. Malab.* xii. *p.* 31. *t.* 15.

Hab. Common, apparently all over the continent of India, from the Madras Peninsula to north-west India, and along the Himalaya to Buntan, and southeastward to Moulmein, *Wallich, Griffith, Hook. fil. and Thomson, Parish, etc.* China, Lappas Island, *Vachell.* Hongkong, *Hance*, n. 82; *Col. Urquhart*, n. 63. Java, *Blume, in Herb. Nostr.* (one of the specimens named "*Diplazium sylvaticum*"), *Millett.* Ceylon, *Thwaites*, n. 3270; *Gardner*, n. 1351. Feejee

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* I am aware that Mr. Moore considers Mr. J. Smith's *Stenosemia aurita* (no *Stenosemia*, certainly) to be the plant Presl had in view for his *Digrammaria ambigua*; for he says, "there can be no doubt, from Presl's figure and description, that this is the plant he intended to call *Digrammaria*, but all his synonyms are erroneous." But Presl was surely too acute a pteridologist to commit such an error, and to give two figures with strongly serrated margins (as in the plant before us) to the lobes, while those of J. Smith's *Stenosemia* are quite entire. Indeed, as far as I know, this plant is exclusively a discovery of Mr. Cuming; and, as such, Presl describes it most accurately in his 'Epimelia Botanica' (quoted by Mr. Moore), under the name of *Heterogonium aspidioides*. That Presl's *Digrammaria* is generically identical with *Asplenium* (or *Anisogonium*) *decussatum*, there cannot be the smallest question.

Islands, *Brackenridge*.—That this is a polymorphous plant cannot be denied, but the pinnæ vary as much in one and the same specimen as they do in different individuals and I scarcely see the necessity for the numerous (six) varieties and subvarieties indicated by Mettenius. The species is readily recognized, if only the nature of the venation be considered, coupled with the diplazioid sori and the copiously bipinnate ramification, together with the numerous horizontal pinnules, very uniform in general outline,—from a broad and often hastate truncated base gradually diminishing in width to the apex. The margins, indeed, of the pinnules are angularly inconstant, variously serrated and lobed and pinnatifid.

301. A. (Anisogonium) *decussatum*, Sw.; caudex "erect scaly," stipes stout 1–2 feet long deciduously scaly smooth or muricated, fronds 2–4 feet long broad-oblong acuminate subcoriaceous pinnated often with scaly proliferous axillary bulbs, pinnæ numerous large horizontally patent sessile 6–10 inches and more long often 2 inches broad sessile from a broad truncated and subcordate and on each side subauricled base oblong gradually narrower to the acute or acuminated apex the margin entire or serrated or irregularly sinuato-lobate rarely below again pinnate with oval-oblong acute pinnæ, terminal pinnæ large hastato-triangular broad at the base and pinnatifid with long segments entire or serrated at the acuminated apex, veins copious fasciculato-pinnate branches or veinlets uniting and anastomosing more or less copiously, forming triangular areoles next the costæ the rest more or less elongated, sori upon all the veins and anastomosing with them, involucres narrow mostly diplazioid.—*Sw. Syn. Fil. p.* 76 *and* 260 (*description excellent*). *Willd. Sp. Pl.* v. *p.* 173. *Metten. Asplen. p.* 173. Anisogonium, *Pr. Tent. Pterid. p.* 116. *t.* 4. *f.* 13. *Hook. Gen. Fil. p.* 56. (Tab. *A. f.* 1–4) Aspl. proliferum, *Lam. Wall. Cat. p.* 236. *Metten. Fil. Hort. Lips. p.* 74. *t.* 11. *f.* 7. Diplazium, *Petit. Th. Kaulf. En. Fil. p.* 182. *Sieb. Syn. Fil. p.* 30. D. bulbiferum, *Boj. in Herb. Hook.* D. horridum, *Kze. Annal. p.* 26. D. Swartzii, *Bl. En. Fil. Jav. p.* 191. D. repandum, *Bl. En. p.* 191, *and in Herb. Hook.* Aspl. spinulosum, *Bl. En. Fil. p.* 193 *et in Herb. Hook.* (*stipes and rachis distinctly muricate or aculeate*). Callipteris, *J. Sm.* Asplenium, *Metten. Asplen. p.* 172. Diplazium accedens, *Bl. En. p.* 192. D. incisum, "*Schuhm. R. Dansk. Vidensk. Afhandl.* iv. *p.* 232." Digrammaria robusta, *Fée, Gen. p.* 218. *t.* 18 *B.*

Hab. Mauritius and Bourbon, abundant. Java, *Blume, Thos. Lobb.* Isle of Leyte, *Cuming*, n. 303 (very aculeate). Ternate, Moluccas, *Blume.* Borneo, *Motley*, n. 575. Upper Assam, *Griffith, Simons* (more membranaceous, veins less regularly pinnate, but often irregularly anastomosing). Solomon's Group, S. Pacific, *Milne.* Feejee Islands, *Brackenridge* (some pinnæ again pinnated at the

base). New Ireland, *Hindes*. Tobie Island, *Barclay*. W. Tropical Africa, *Curror*. Fernando Po, *Vogel*, *Niger Exped.* n. 130 (stipes and rachis muricated), *Barter*. —This is a noble species, and seems widely distributed, and, as is then generally the case, trifling varieties are unnecessarily multiplied into species. The muricated character of the stipes and rachis is common even to the Mauritius form. The *Digrammaria robusta* is merely a luxuriant state, having some of the pinnæ again pinnate below, the rest deeply pinnatifid, and is seen on specimens from Bourbon (whence I have pinnæ of the kind 18 inches long), the Mauritius, and in the Pacific Islands, found by Brackenridge and Milne.*

E. HEMIDICTYUM.—*Sori very long, naked, asplenioid (single). Veins anastomosing towards the margin.*—Hemidictyum, *Pr.* (Hook. Gen. Fil. t. 55. *A.*) Asplenidictyon, *J. Sm.* Ceterach (Hook. Gen. Fil. t. 63 *A*).

(*Veinlets at their apices combined with a continuous, transverse, marginal vein.* —*Gen.* Hemidictyum, *Pr.*)

302. A. (Hemidictyum) ***marginatum***, L.; glabrous, caudex erect short thick rooting subarboreous, stipites stout 2–3 feet long subulate paleaceous below, fronds ample 4–6 feet long membranaceous pinnated, pinnæ 12–18 inches long 3–4 inches wide broad-oblong shortly acuminate sessile auriculato-cordate and crenato-sinuate at the base, costa stout, veins horizontally patent forked free below towards the margin copiously anastomosing and forming subhexangular network near the margin, the veinlets uniting with a transverse continuous vein just within the margin, sori copious linear very long parallel free.—*Linn. Sp. Pl. p.* 309. *Sw. Syn. Fil. p.* 76. *Willd. Sp. Pl. p.* 309. *Hook. Fil. Exot. t.* 63. *Metten. Asplen. p.* 170. A. limbatum, *Willd.*, *and* A. Mikani, *Pr.* Hemidictyum marginatum, *Pr. Tent. Pterid. p.* 111. *t.* 3. *f.* 24. *Hook. Gen. Fil. t.* 55 *A.* H. Peruvianum, *Pr. Epimel. Bot. p.* 74. *Plum. Fil. t.* 88. *f.* 106.

Hab. One of the finest and most common of tropical American Ferns, especially in the West Indian Islands, on the borders of streams, and in damp, moist, and shady woods. On the continent of S. America it is perhaps less abundant. We possess it from Brazil, *Raddi*, *Gardner*, n. 31. Venezuela, *Funck*, n. 77; *Fendler*, n. 167. Tarapota, Eastern Peru, *Spruce*, n. 4783.

(*Terminal veinlets at the apices free, or rarely connected at the margin.*— *Gen.* Asplenidictyon, *J. Sm.*)

303. A. (Hemidictyon) ***Finlaysonianum***, Wall.; caudex

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* Dubious species of this *Anisogonium*- (or *Callipteris*-)group, at least referred to it by Mettenius, are as follows:—*Diplazium spinosum*, Bory. Sandwich Islands. ——*Asplenium Luzoniense*, Spr. Luzon.——*Diplaz. fraxinifolium*, Pr. (not Wall.). Luzon.——*Diplaz. serratum*, Schuhm. W. Africa. Probably *Aspl. decussatum*.——*Diplaz. undulosum*, Sw.; Sw. Syn. Fil. p. 92, 284. Martinique. ——*Diplaz. heteropteron*, Kze. Ceylon, *Gardner*, n. 35.——*Aspl. Manilense*, Spr. Manila.

erect stout woody scaly at the summit rooting below, stipites and rachis compressed deciduously scaly below, fronds 1-1½ foot long coriaceous (brownish-green when dry) oblong pinnate, pinnæ remote 5, 16 or 17 erecto-patent inequilaterally and subfalcately ovato-lanceolate long acuminate entire or sinuato-subangulate subauriculate unequally cuneate at the base and gradually attenuated into the petiole scarcely costate, terminal one subrhomboid unequally 3-lobed, veins subflabellate diverging from an indistinct costa dichotomous free below anastomosing towards the margin into very elongated subhexagonal areoles, terminal veinlets free or rarely combined in arches at the margin, sori linear elongated but varying much in length originating at the centre but never extending to the margin, involucres narrow.—*Wall. Cat. n.* 191. *Hook. Ic. Plant. t.* 937 (*veinlets too copiously arched at the margin*). A. integerrimum, *Wall. MS. Hook. et Grev. Ic. Fil. t.* 136 (*inaccurate in the venation*). Hemidictyon Finlaysonianum, *Moore, Ind. Fil. p.* 1. H. Hookerianum, *Moore, Ind. Fil. p.* 130 (*who quotes* A. Hookerianum, *Wall. Cat. n.* 2682).

Hab. Penang and neighbouring islands, *Wallich, in Herb. Nostr., Sir Wm. Norris.* Mishmee, *Griffith.* Sikkim, Khasya, and Assam, *Griffith, Hook. fil. and Thomson, Simons* Nepal, and Kamoun, *Wallich, n* 2682, *in Herb. Nostr.* (without name). —Our lamented friend Wallich seems to have given more than one name to his specimen of this fine and very distinct species—distinct especially if the venation be considered, for some specimens of *Aspl. macrophyllum* bear considerable resemblance to this. On the other hand, we have led botanists into error by Dr. Greville and myself having figured this with the venation of an *Euasplenium*. I trust the present description, and our figure in 'Icones Plantarum,' will have rendered this species intelligible to botanists.

304. A. (Hemidictyum) *Purdieanum*, Hook.; caudex small subligneous very scaly copiously rooting with branched fibres, stipites subfascicled less than a span long and the compressed rachis very paleaceous with brown scales, fronds scarcely more than a span long coriaceo-membranaceous opaque cordato-subrotund in circumscription pinnate, pinnæ large 5-7 lateral ones often opposite subsessile inequilaterally ovato-lanceolate sharply acuminate obliquely cuneate at the base the inferior side or margin often rotundate, terminal pinna broad subrhombeo-ovate acuminate equilateral sometimes subhastate with unequal lobes, veins dichotomous oblique free near the slender costa, anastomosing with oblong subhexagonal areoles towards the margin, ultimate veinlets free or forming an arch with the adjacent one, rachis more

or less scaly.—*Hook. Ic. Plant.* x. *t.* 938. A. Purdieanoides, *Karst. Fl. Columb.* i. *t.* 32.

Hab. Jamaica: moist woods; La Fundacion, *Purdie.* Columbia, *Karsten.*—The affinity of this with our *A. Finlaysonianum* will be evident to those who have the opportunity of comparing it with specimens of our preceding species, from which it is truly distinct. The *Aspl. Purdieanoides* of Karsten shows that the same species is now found in Columbia, where it is the representative of the Indian *A. Finlaysonianum.*

(*Veins and veinlets as in the last Subsection. Sori short. Involucres obsolete. Back of the frond covered with densely imbricated, reticulated scales.—Genus* Ceterach *of Adanson and others.*)

305. A. (Hemidictyum) *Ceterach*, L.; caudex short thick densely rooting, fronds 6–10 inches long cæspitose lanceolate tapering below into a scaly slender stipes coriaceous opaque deeply pinnatifid subpinnate at the base green above and naked beneath densely clothed with imbricated tawny entire or toothed scales, segments broad-ovate or oblong horizontal obtuse lower ones or pinnæ much abbreviated, veins anastomosing copiously towards the margin, sori short-oblong, involucre very narrow often obsolete.—*Linn. Sp. Pl. p.* 1538. Grammitis Ceterach, *Sw. Syn. Fil. p.* 23. Ceterach officinarum, *Willd. Sp. Pl.* v. *p.* 136. *Webb, Fl. Canar.* iii. *p.* 443. *Hook. Gen. Fil. t.* 113 A, *and Brit. Flora, ed.* 7. *t.* 9. *f.* 1. *Mett. Hort. Fil. Lips. p.* 80. *Pappe and Raws. Syn. Fil. Afr. Austr. p.* 23. Scolopendrium Ceterach, *Sm. Engl. Bot. t.* 1244. Gymnogramme Ceterach, *Spr.*—*β. aureum*; larger, segments more elongated, scales toothed. Ceterach aureum, *Link, in Von Buch, Canar. Ins. p.* 138. *Webb, Fl. Canar.* iii. *p.* 433. Acrostichum aureum, "*Cav. Anal. de Cienc. Nat.* iv. *p.* 104." Grammitis aurea, *Sw. Syn. Fil. p.* 33 *and p.* 45. Ceterach Canariensis, *Willd. Sp. Pl.* v. *p.* 137. Asplenium latifolium, *Bory, Isles Fort. p.* 311. *t.* 6. Ceterach latifolium, *Fée, Gen. Fil. p.* 206. *t.* 30. *f.* 1 (*excellent*).

Hab. From the islands of Gothland, north (*Fries*), to the Canary Islands and Azores, south. Eastward it extends to Uralian Siberia, through southern Europe and the Caucasus, Asia Minor to Kurdistan, *Major Garden*; to North-western India, Persia, prov. Karabagh, *Scovitz.* Afghan, Kashmir, Tibet, *Edgworth, Griffith, Hook. fil. and Thomson*, etc.—I find no record of its being found on the continent of Africa except in the extreme north, Algeria, *Hochstetter*, and south at Bavian's River, Cape of Good Hope, *Krebs*, as stated in the Linnæa, x. p. 496. The report of its being found in Brazil is probably founded in error.—Var. *β. aureum.* Common on the moist rocks of the lower regions of the islands of Teneriffe and Palma, *Bory, Von Buch, Webb.* We possess fine specimens from the last-mentioned gentleman, from *Bourgeau, C. Lemann*, etc.—This well-known Fern has, as a genus, had no resting-place, and now I have ventured to restore to it its old Linnæan name. Most botanists have considered the sori to be destitute of involucre, and have

ranked it among the *Nudisori*. Mr. W. Wilson was the first to direct my attention, in 1828, to the presence of a narrow involucre of an *Asplenium*, such as we have figured it in the 'Genera Filicum,' and in the 'British Flora,' and M. Fée has detected and represented a much more distinct involucre in the var. *aureum*. We have thus only the partially anastomosing venation, like that of *Hemidictyum*, to depend upon for generic distinction. Our plant has, in habit, the closest affinity with *Aspl alternans*, Wall., which latter, however, has free venation and no paleaceous covering to the under side of the frond. Mettenius maintains the genus *Ceterach*, but he ignores the existence of an involucre ("sori laterales indusiati, cæterum *Asplenii*," and refers *Gymnogramme Capensis* to the same genus, as did M. Fée in his Gen Fil., p. 206, where he says that "la présence d'un indusium, toutefois très-difficile à reconnaître, et que cependant nous sommes parvenus à constater, les place parmi les *Asplénitées*"). Nevertheless, in the "additions and corrections" of the same work, at p. 363, Fée suggests, most properly according to his views, the separation of the latter on account of the free venation, but denies the existence of an involucre in the true *Ceterach*; "Ce que nous regardions comme tel, n'est autre chose que la nerville réceptaculaire renflée et chargée des débris de pédicelles de sporangiastres fasciculée à leur base" In illustration of this he refers to figures in a supplementary plate (t. 30), and represents, from recent analyses, several sori both of *C. officinarum* and *C. aureum* (*C. latifolium*, Fée), with what have every appearance of well-defined, true involucres of an *Asplenium*, but narrow -in short, such as we have ourselves seen and figured, and such as Moore and Webb have described Such an organ we cannot therefore doubt exists, and every one must form his own opinion as to its real nature and importance. Our largest and finest specimens of British *A. Ceterach* are gathered in Ireland by Fred. J. Foot, Esq, and these have broader and sinuated segments to the fronds; but a more remarkable variety we fear we must only consider it to be, is the *Ceterach aureum** of the Canary Islands.

2. ALLANTODIA, *Wall., Br. in part.*

(*Wallich, Pl. Asiat. Rar. t.* 52. HOOK. GEN. FIL. TAB. CXX. A. Hemidictyum, *Pr.* Asplenium, *Wall., Metten., Bl.*)

Sori involucrate, single, dorsal, attached to the primary veins, oblong. *Involucre* dark-brown, subcoriaceo-membrana-

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* Unable to detect any sound specific character in this supposed species, I consulted my valued friend the Rev. R. T. Lowe, who sends me the following reply.—"In my opinion, *C. aureum*, Cav. (*Aspl. latifolium*, Bory), is not distinct as a species from *C. officinarum*, W Whon I first went to Madeira, in 1826, I was fully primed for distinguishing the two, and I experienced, consequently, no small amount of puzzle and vexation at encountering continually plants which, from their smaller size and other characters, could be referred to nothing but our British *C. officinarum*, and yet possessed the toothed scales of *C aureum* I soon found, however, that no dependence could be placed on one or other of the characters assigned to *C. aureum*, and I settled in my own mind, that the Madeira plant, at all events, was nothing but the European *C. officinarum*, W., though in size often verging towards, and in the more or less toothed scales agreeing with, the so-called Canarian *C aureum*. In Grand Canary, and especially in Hierro last year, I found myself equally unable to draw any line of distinction between the two. On the north-west coast of Hierro, in that wonderful district called El Golfo, where the cliffs, receding from the sea, and clothed with noble

ceous, cylindrical, quite surrounding the sorus and including the *receptacle*, bursting open irregularly and longitudinally in such a manner as to be imperfectly 2-valved.—*Tropical Fern of the East Indies and Pacific Islands.* Fronds *ample, pinnated, herbaceo-membranaceous.* Pinnæ *large, numerous, oblong-lanceolate, sessile, finely acuminated.* Veins *free, and forked near the base, and there only soriferous, anastomosing into subhexagonal areoles towards the margin.*

1. All. *Brunoniana*, Wall. *Pl. Asiat. Rar. p.* 44. *t.* 52. *Cat. p.* 63. *Hook. Gen. Fil. l. c. Moore, Ind. Fil. p.* 43. Hemidictyum? Brunonis, *Pr. Tent. Pterid. p.* 111. *t.* 3. *f.* 25, 26. Asplenium Brunonianum, *Metten. Fil. Hort. Lips. p.* 71. *Asplen. p.* 170. Asplen. reticulatum, *Wall. Cat. n.* 188. A. Javanicum, *Bl. En. Fil. Jav. p.* 175.

Hab. Tahiti, *Nelson.* Nepal and Sheopore, *Wallich.* Ceylon, *Gardner, n.* 1057. Assam, *Simons.* Sikkim, elev. 6000 feet, *Hook. fil. and Thomson.* Java, *Blume, Millett.*—This fine Fern is very different in habit and venation from the original *Allantodia umbrosa* and *A. australis*, which can hardly with propriety be separated from the *Athyrium*-group of *Asplenium.* It is true that, in both, the unexpanded involucre is oblong-cylindraceous; but the normal mode of bursting in the two now mentioned is at the superior margin, as in *Asplenium*: here it is at a distance from either side, so that, when burst, a portion remains attached on each side the sorus. The general aspect of the Fern, as well as the venation, resembles *Hemidictyum*: from which the involucres are totally different.

3. Actiniopteris, *Link.*

(Hook. Ic. Pl. tab. DCCCCLXXV.–VI. Asplenium, *Sw. and others.* Blechnum, *Pr.* Acrostichum, *Vahl, and*

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forests, form a majestic crescent three or four miles deep, with a chord of fifteen or twenty miles in length, raising themselves almost perpendicularly to a height of 3000 or 4000 feet, a *Ceterach* abounds, varying through every possible grade of form and magnitude, from our common dwarf dry-wall *C. officinarum*, with fronds 2–4 inches long, to splendid tufts of bright green and golden-ferruginous fronds, 12–18 or even 24 inches long, and presenting in their fullest development all the characters ascribed to *C. aureum.* In a less striking manner, because on a wider field, I found the same in Grand Canary. There, in the lower, drier regions, you find only the smaller Madeiran form: in the higher and moister (*e.g.* the remains of the ancient forest region of Doramas), you have the large, luxuriant plant of El Golfo. I could arrive in the Canaries, therefore, at no other conclusion than in Madeira, viz. that there is in both groups only one species, the extreme forms of which appear very different, but which pass imperceptibly into each other, and that the smaller forms cannot be distinguished from *C. officinarum*, W. The locality in Hierro above specified is remarkable for the rankness and luxuriance of *all* its vegetation. So is that of Grand Canary."

others. Acropteris, *Fée, Gen. t. 6 A. f. 2.* Pteris, *Hook. et Grev. Ic. Fil. t. 8. Metten.*)

Sori involucrate, linear, much elongated, submarginal. *Involucre* plane, membranaceous, firm, attached just within the margin, one on each side the narrow segments of the frond opening towards the costa. *Receptacle* filiform, in the axis of the involucre.—*A small, harsh, rigid, tufted Fern of India and Africa.* Caudex *small, subglobose, rooting.* Stipites *dense, deciduously paleaceous.* Fronds *subdimorphous, forked, once or several times dichotomous and flabellate.* Segments *linear or subulate, fertile ones more elongated than the sterile.* Costa *indistinct.* Veins *few and nearly parallel with the costa.*

A solitary species, and a Fern perfectly *sui generis* Even its place in the Fern arrangement is doubtful. Link says: "*Blechno* et *Lomariæ* proximum est genus." Dr. Greville and myself had long ago referred it to *Pteris;* and there the accurate Mettenius places it. The frond is in no way foliaceous, but rachiform in its divisions; and, before expansion, it is, as it were, refracted (not circinate) upon the stipes, and its appearance then, and even when fully developed, very much like some small *Chamærops* among the Palms.

1. Acr. *radiata,* Link, *Fil. Sp. Hort. Berol. p.* 80. *Hook. Ic. Fil. l. c.* Asplenium radiatum, *König.* Acrostichum australe, *Vahl, Symbol.* i. *p.* 84. *t.* 25. Acrostichum dichotomum, *Försk. F. Ægypt. Arab. p.* 184. Acropteris radiata, *Fée, Gen. Fil. p.* 76. Pteris, *Metten. Fil. Hort. Lips. p.* 53. Blechnum flabellatum, *Pr. Tent. Pterid. p.* 103.—Var. *β. australis;* segments of the fronds much elongated fewer scarcely radiating or flabelliform their apices mostly entire subulate. *Hook. Ic. Pl. t.* 976. Actiniopteris australis, *Link, Fil. Hort. Berol. p.* 80. Asplenium, *Sw. Syn. Fil. p.* 76 *and p.* 258. *t.* 3. *Willd. Sp. Pl.* v. *p.* 308. Acrostichum, *Linn. Suppl. p.* 444. Pteris, *Hook. et Grev. Ic. Fil. t.* 8. *Metten. Fil. Hort. Lips. p.* 53. Blechnum flabellatum, *Pr. Tent. Pterid. p.* 103.

Hab. Arabia. *Förskal.* Upper Egypt and Cordofan, *Kotschy.* South Africa, Macalisberg, *Burke, in Herb. Nostr* Madagascar, Bourbon (*Swartz*). *Carmichael.* Scinde, *Stocks.* Bombay, *Dr. Gibson.* Old walls, Madras, common, *Dr. Wight, n.* 109; *Gid. Thomson.* Northern India, *Edgeworth.* Moradabad, *Dr. T. Thomson.* Agra, and Sikaan in Ava, *Wallich, Cat. n.* 137.—Var. *β. australis.* Mauritius and Bourbon, *Sonnerat, Carmichael, and others.* Schoata, near Enderder, Abyssinia, *Schimper, n.* 577.—It is only the result of an examination of extensive suites of specimens that I venture to consider what have hitherto been considered to constitute two species, are in reality only one; for there seem to be all intermediate grades.

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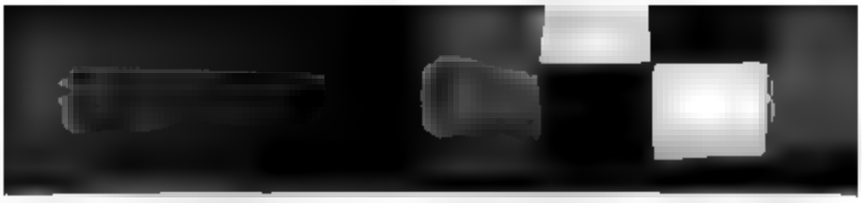

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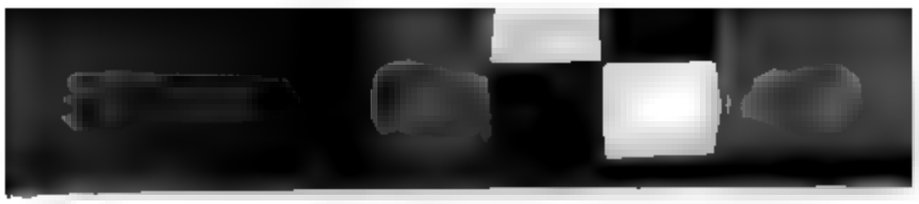

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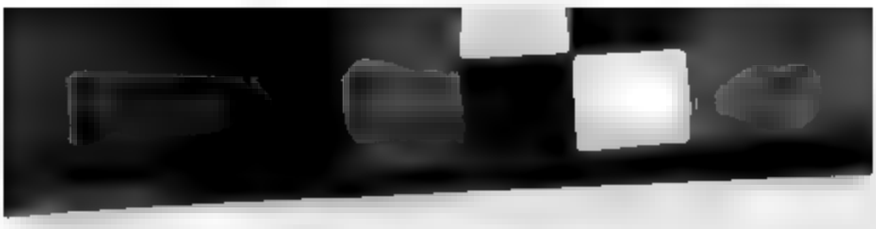


Tab. CXLI.

A. Pteris (Ornithopteris) aquilina, *L.*—Var. *a*, *glabra*.—See vol. ii. p. 195, note.

Portion of a frond seen from above, *nat. size;* with analyses of the fructification showing the general presence of a double involucre; *magnified*.

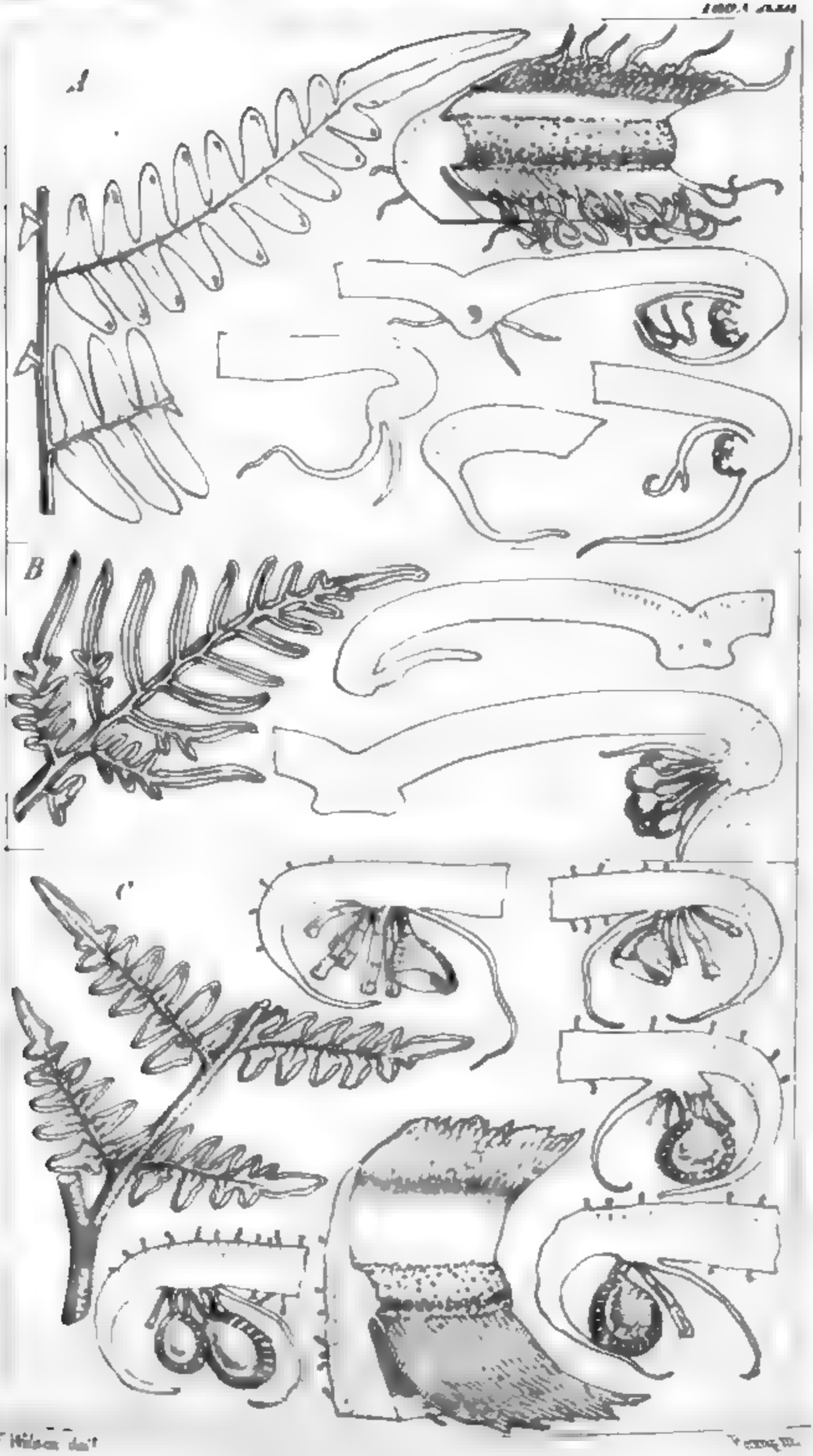
B. Pteris (Ornithopteris) aquilina, *L.*—Var. δ, *esculenta*.—See vol. ii. p. 195, note.

Portion of a fertile frond, seen from beneath, *nat. size;* with two sections, one exhibiting the presence of a double involucre, the other of a single involucre; *magnified*.

C. Pteris (Ornithopteris) scalaris, *Moritz*.—See vol. ii. p. 200,* and Tab. CXXI. B.

Portion of a fertile frond, seen from beneath, *nat. size;* with analyses showing the presence of a double involucre.—N.B. All the analyses on this Plate are prepared by W. Wilson, Esq.

* Since our remarks were printed on this *Orthopteris*-group of *Pteris* in our second volume, Professor Mettenius has published an interesting memoir on the same (with figures), entitled, "Ueber einige Schleier-versehenen Arten von *Pteris*;" and Mr. T. Moore has expressed an opinion ('Index Filicum') that the *Pteris scalaris* of Moritz is the genus *Pæsia* of St. Hilaire, in Voy. Distr. Diamans, t. p. 281. I may here add, that Mr. Spruce has recently sent home specimens of *Pt. scalaris*, n. 4666, in his collections from Tarapota, Eastern Peru.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Tab. CXLII.

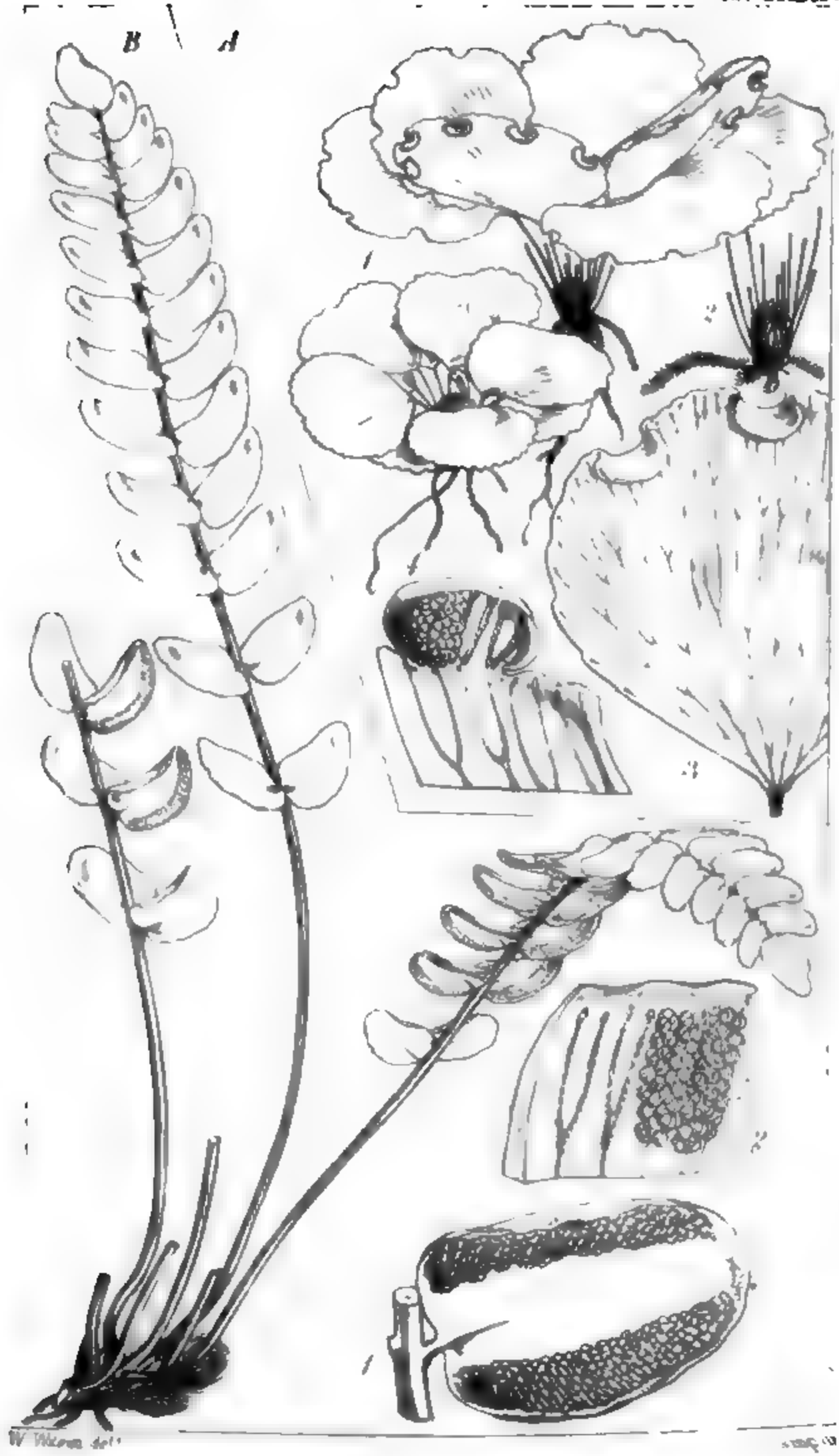
A. Adiantum Parishii, *Hook.*—See vol. ii. p. 237.

Fig. 1. Sterile and fertile plants; *nat. size.* Fig. 2. Appearance of a plant in the dry season, when the fronds have fallen off from the stipes at the joint, and before the development of the new fronds; *nat. size.* Fig. 3. Fertile frond, seen from beneath. Fig. 4. Single involucre, forced back to exhibit the sori and receptacles; *magnified.*

B. Pellæa Bridgesii, *Hook.*—See vol. ii. p. 238.

Fronds (fertile); *nat. size.* Fig. 1. Fertile pinna, seen from beneath. Fig. 2. Portion of ditto, showing the venation and sori; *magnified.*

Tab. CXLII.



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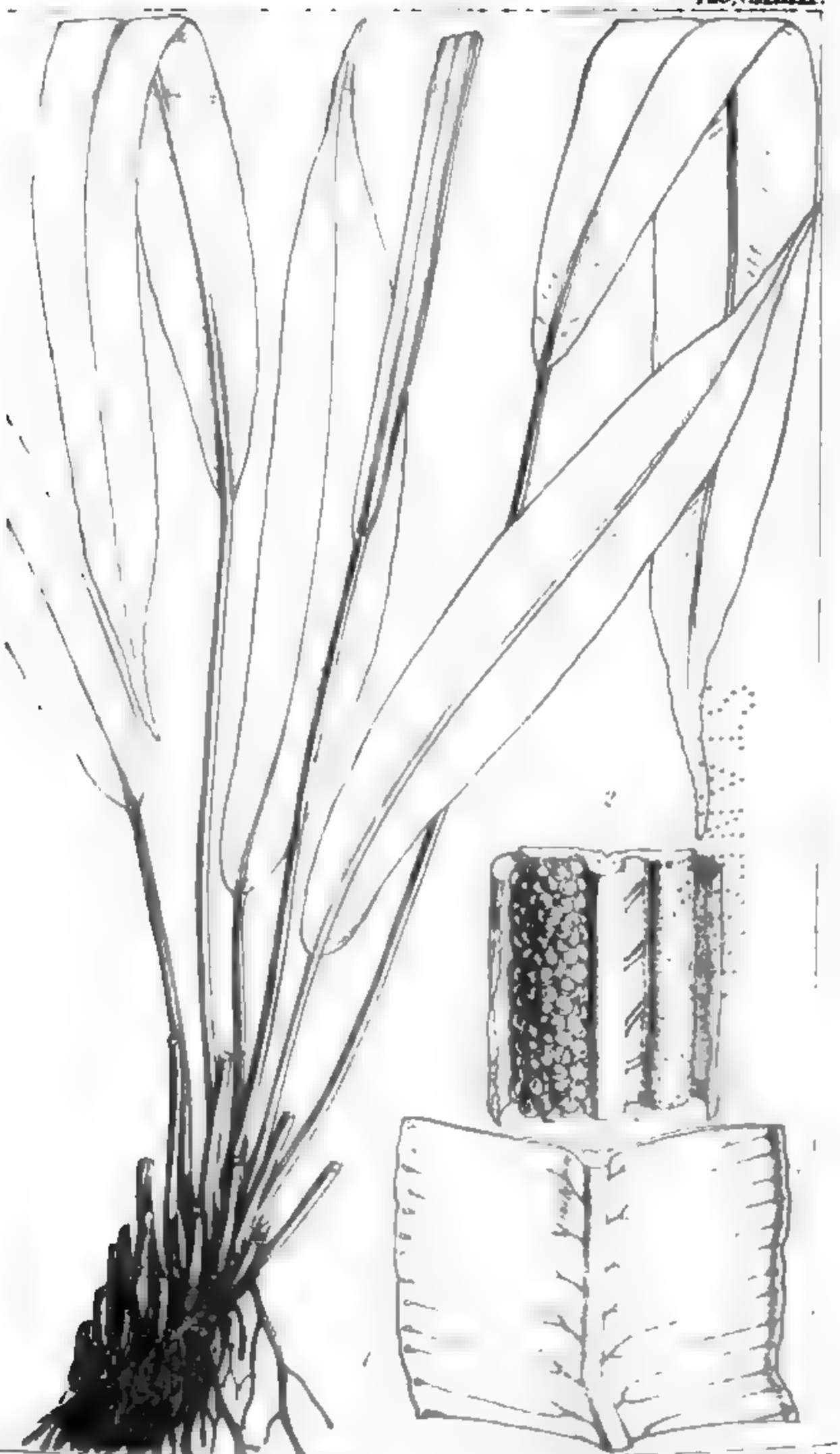
TAB. CXLIII.

LOMARIA ELONGATA.—Var. *β*, *Cumingiana*, Hook.—p. 4.

Tuft of fronds, sterile and fertile; *nat. size.* Fig. 1. Portion of a sterile frond, showing the venation. Fig. 2. Portion of a fertile frond, seen from beneath, showing the involucres and sori; *magnified.*



Tab. CXLIV.

Lomaria aspera, *Klotzsch*.—p. 13.

Plants, showing the sarmentose character of one of the fronds, taking root at the extremity and producing a new plant; sterile and fertile fronds; *nat. size*. Fig. 1. Segment of a sterile frond. Fig. 2. Small portion of a sterile segment, showing the nature of the asperity; *magnified*. Fig. 3. Pinna of a fertile frond, seen from beneath; *magnified*.

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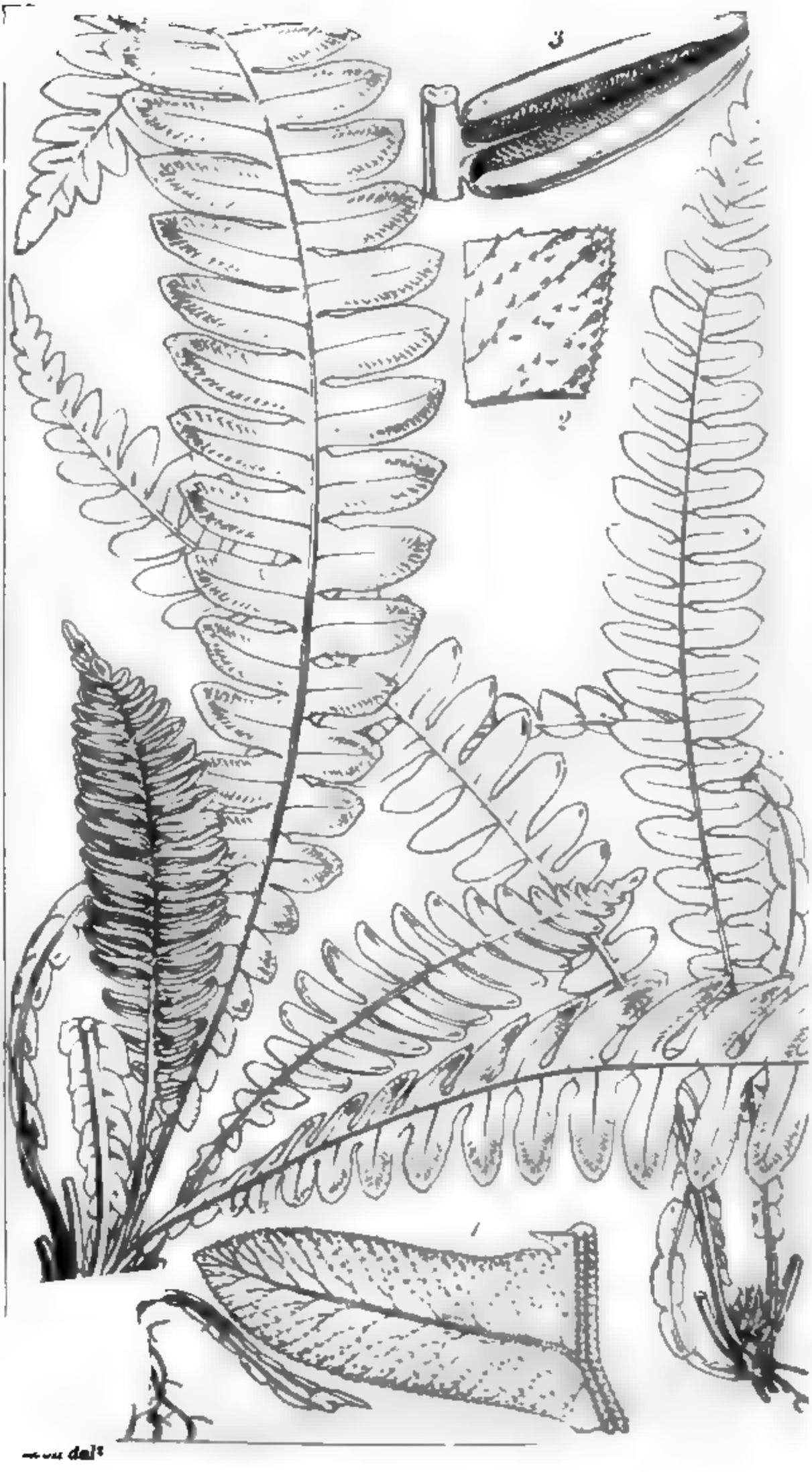
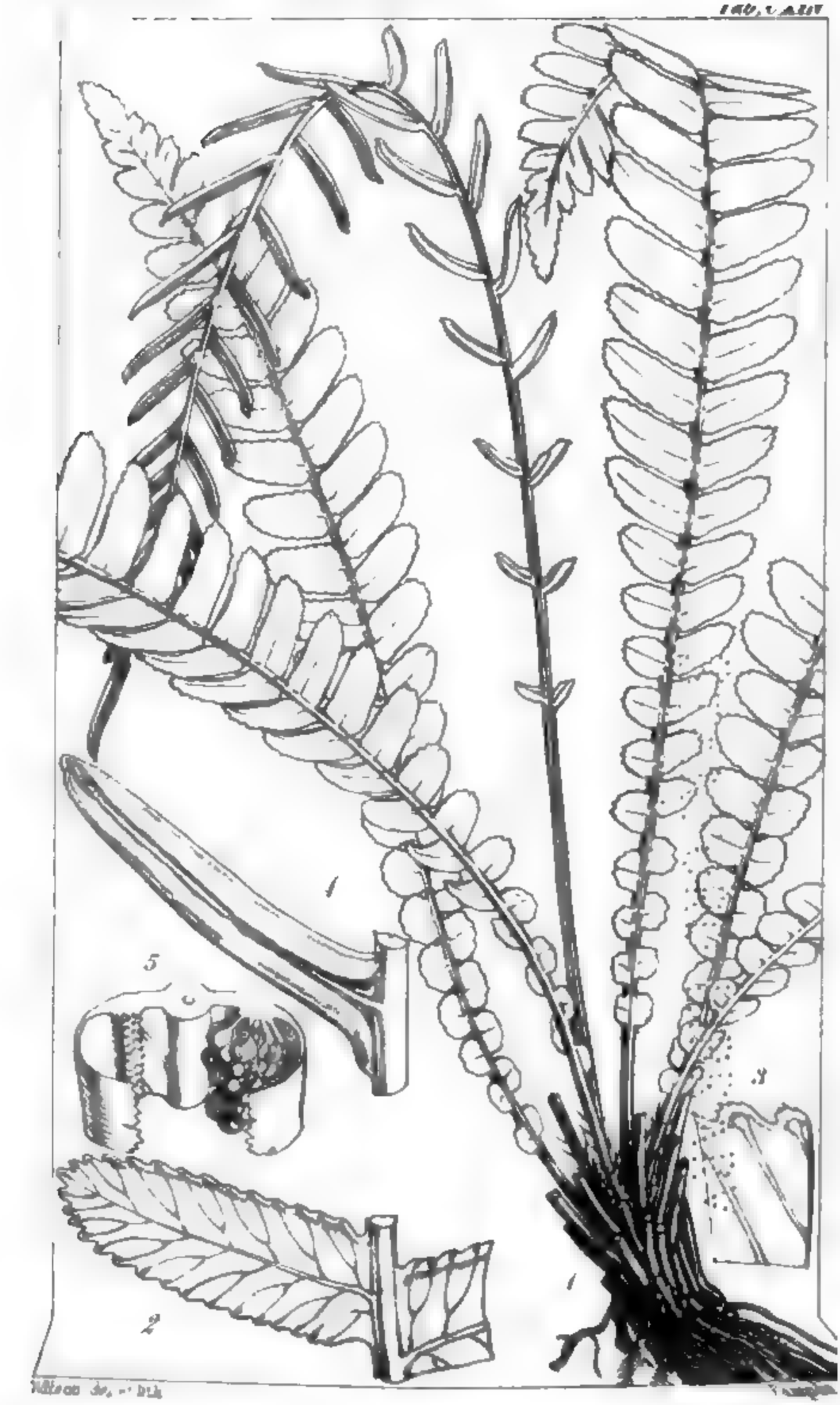


TAB. CXLV.

LOMARIA MEMBRANACEA, *Colenso*.—p. 34.

Fig. 1. Tuft of fronds, sterile and fertile; *nat. size*. Fig. 2. Portion of a sterile frond, showing the venation. Fig. 3. Small portion of the same, showing the apices of the veins. Fig. 4. Fertile pinna. Fig. 5. Section of the same; *magnified*.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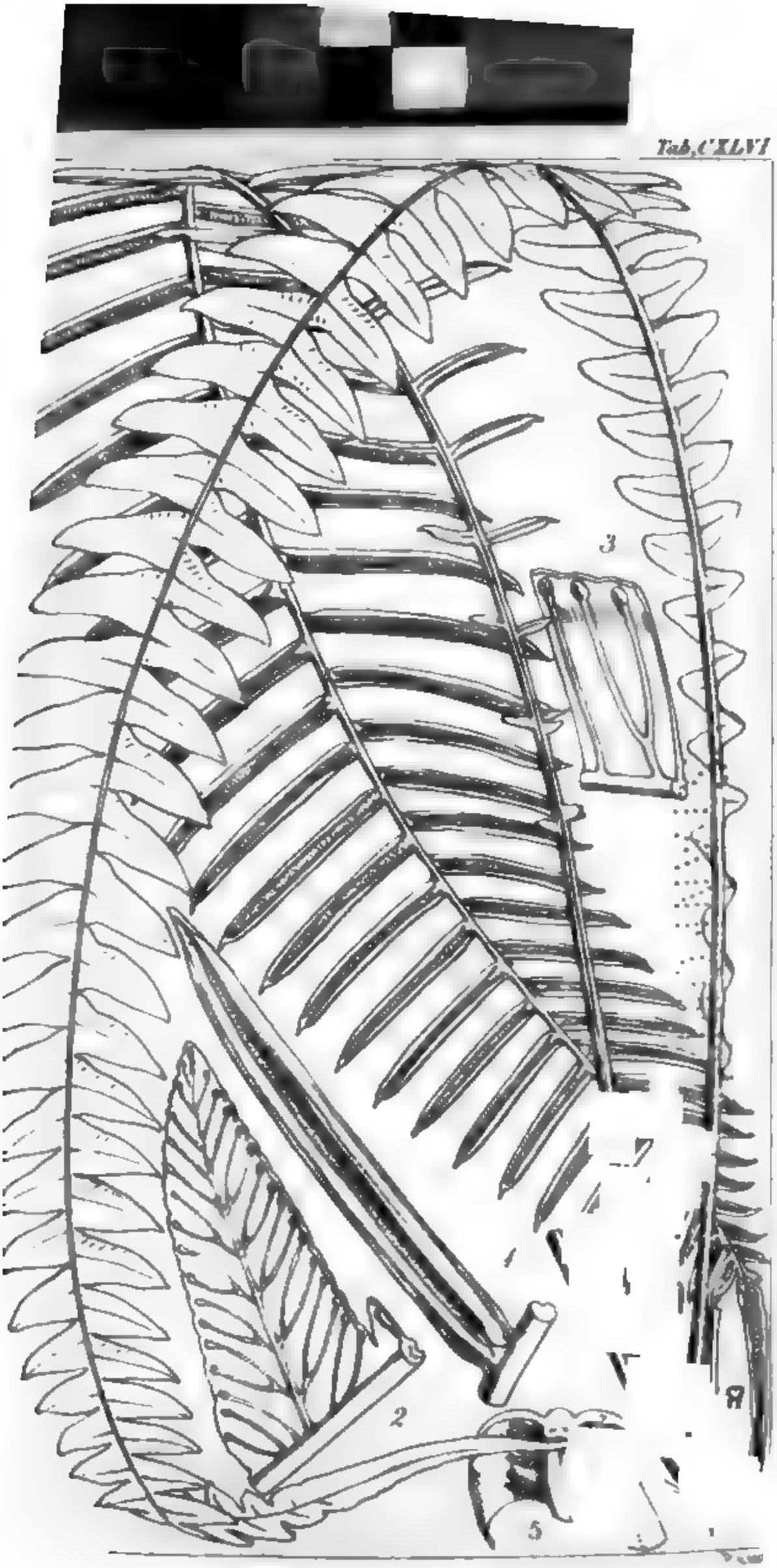
TAB. CXLVI.

LOMARIA ONOCLEOIDES, *Sw.*—p. 9.

Fig. 1. Barren and fertile fronds; *nat. size.* Fig. 2. Segment of a sterile frond, showing the venation. Fig. 3. Portion of a sterile segment; *more highly magnified.* Fig. 4. Fertile pinna, seen from beneath. Fig. 5. Transverse section from ditto; *magnified.*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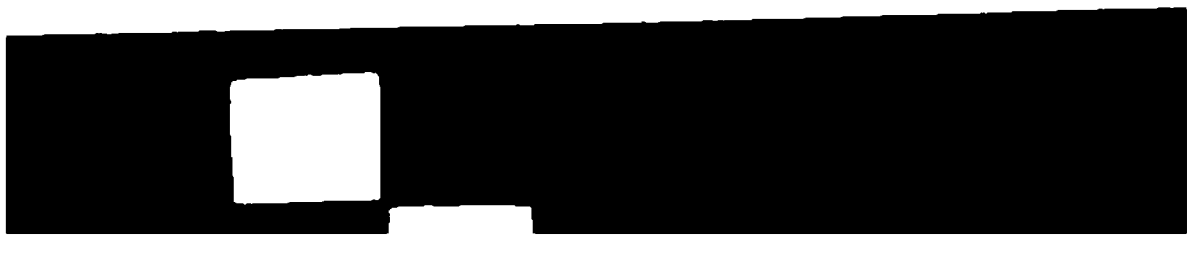
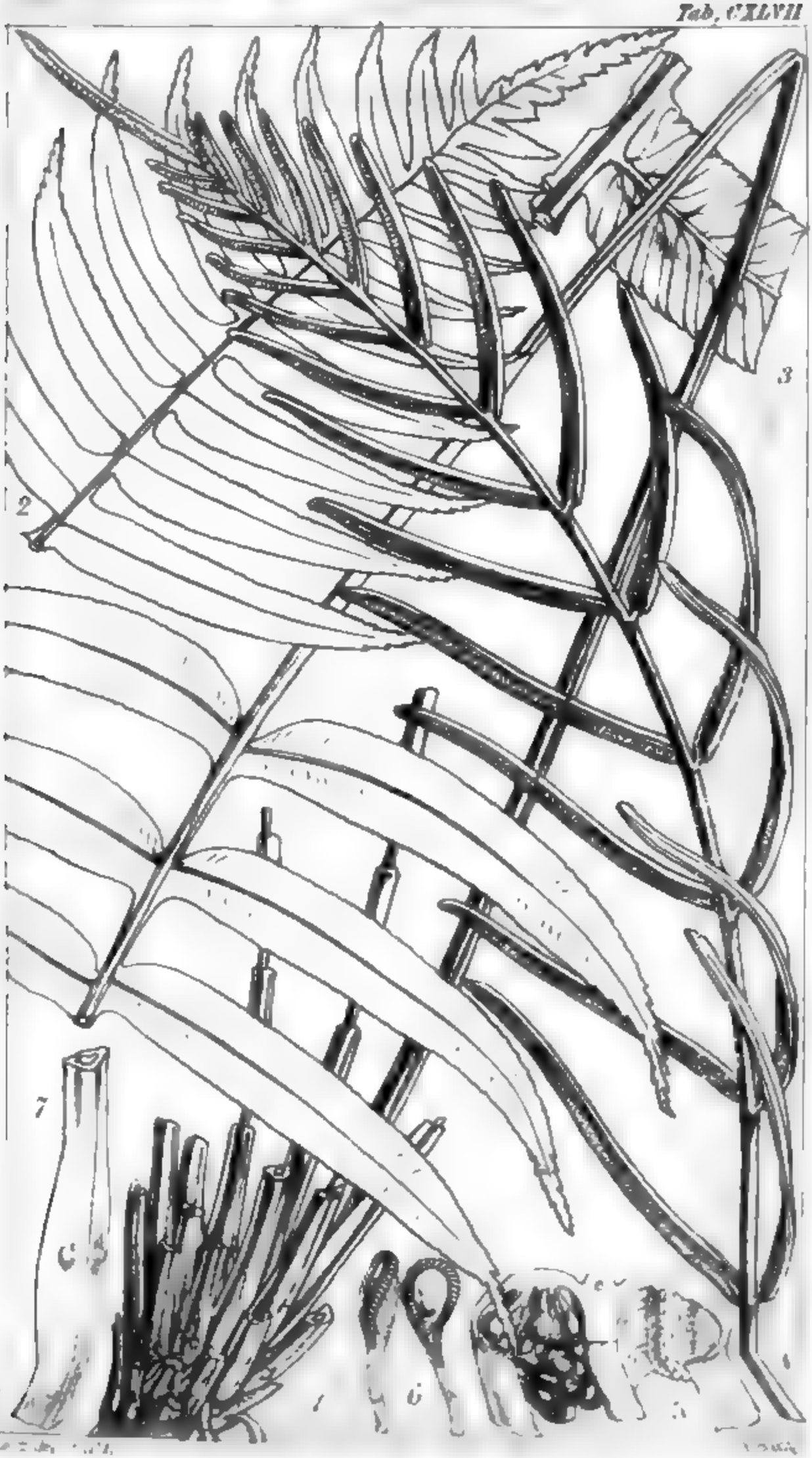


Tab. CXLVII.

Lomaria (Plagiogyria) adnata, *Bl.*—p. 19.

Fig. 1 and 2. Tufted stipites, showing the central chord, from which the circumference easily separates in the form of tubes,—with one sterile frond. Fig. 3. Portion of an adnate pinna, with venation; *magnified*. Fig. 4. Fertile frond, seen from beneath; *nat. size*. Fig. 5. Transverse section from one of the fertile pinnæ. Fig. 6. Capsules, showing the oblique ring (*capsulæ helicogyratæ*). Fig. 7. Triquetrous, fleshy base of the stipes, with glands (*areophoræ*, Mettenius); *more or less magnified*.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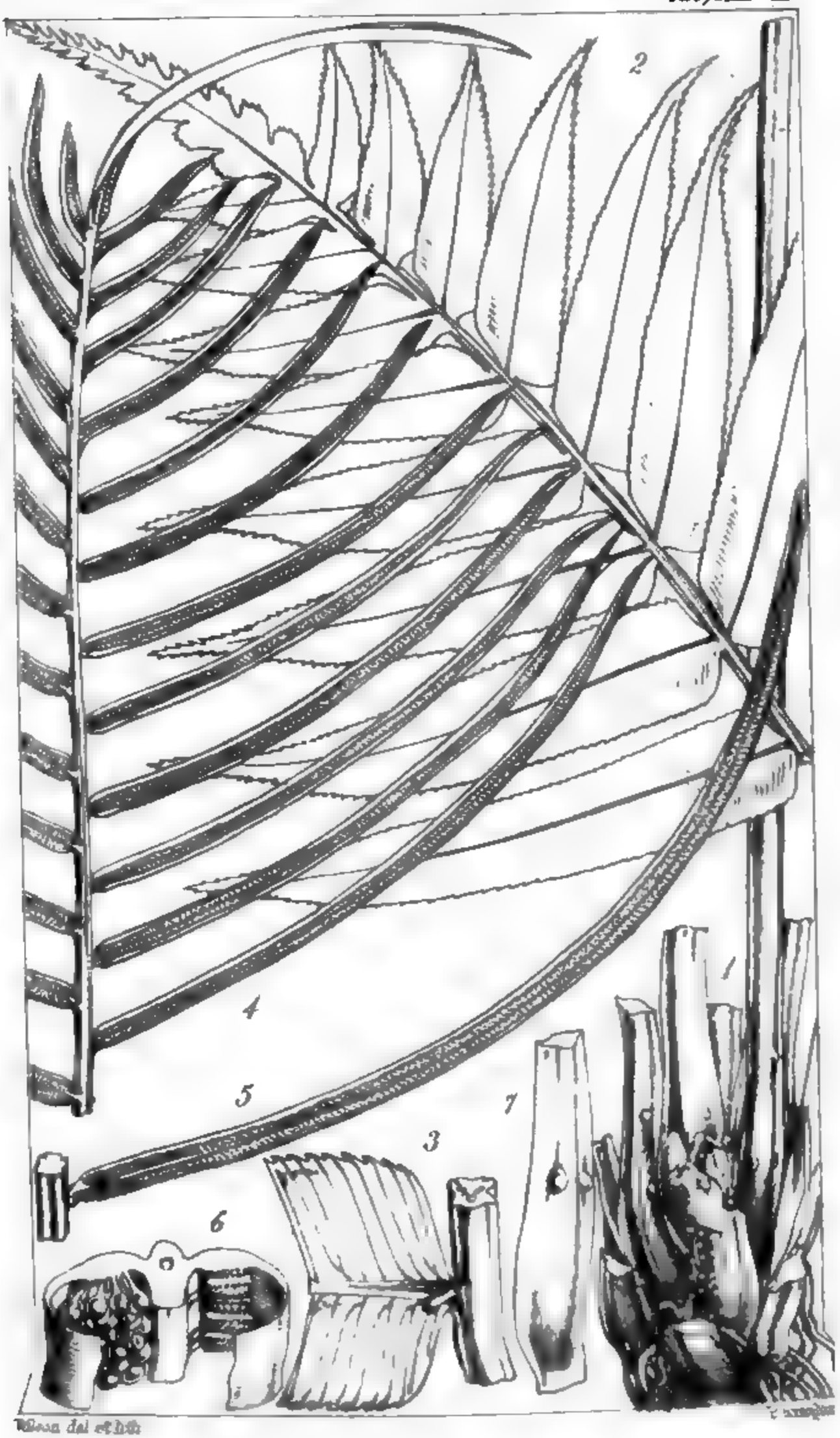
Tab. CXLVIII.

Lomaria (Plagiogyria) pycnophylla, *Kze.*—p. 21.

Fig. 1. Tuft of stipites, some exhibiting the glands peculiar to the group (*Plagiogyria*). Fig. 2. Upper portion of a sterile frond; *nat. size* Fig. 3. Portion of a rachis, and the base of a sterile pinna, showing the pedunculated gland at the setting on of the pinna beneath; *magnified.* Fig. 4. Upper portion of a fertile frond, seen from beneath; *nat. size.* Fig. 5. Single fertile pinna, from near the middle of the frond; *nat. size.* Fig. 6. Transverse section of a fertile pinna; *magnified.* Fig. 7. Base of a stipes, with its glands; *slightly magnified.*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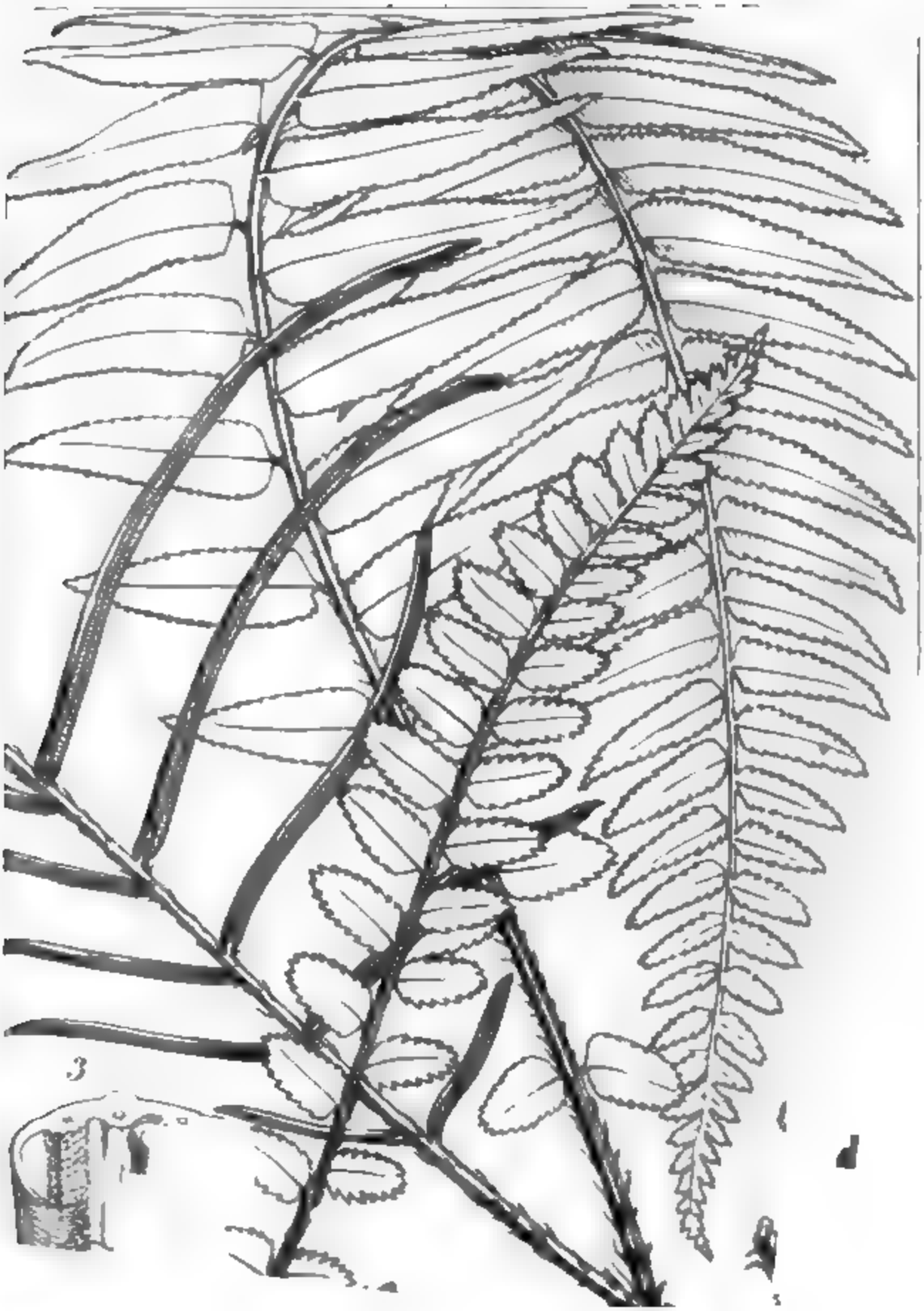
TAB. CXLIX.

LOMARIA FILIFORMIS, *All. Cunn.*—p. 33.

Fig. 1. Upper portion of the scandent caudex, with sterile and fertile fronds of the normal form; *nat. size*. Fig. 2. Portion of a sterile pinna, showing the venation and serratures; *magnified*. Fig. 3. Transverse section from a fertile pinna, seen from beneath; *magnified*. Fig. 4. Lower portion of the scandent caudex, with a sterile abnormal frond; *nat. size*. Fig. 5. Single pinna of ditto; *magnified*.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TAB. CL.

LOMARIA VOLUBILIS, *Hook.*—p. 39.

Fig. 1. Small portions of the long, scandent, and twining rachises (or caudices), with sterile and fertile fronds. Fig. 2. Portion of a sterile pinna, with venation; *magnified*. Fig. 3. Transverse section of a fertile pinna, seen from beneath; *magnified*.

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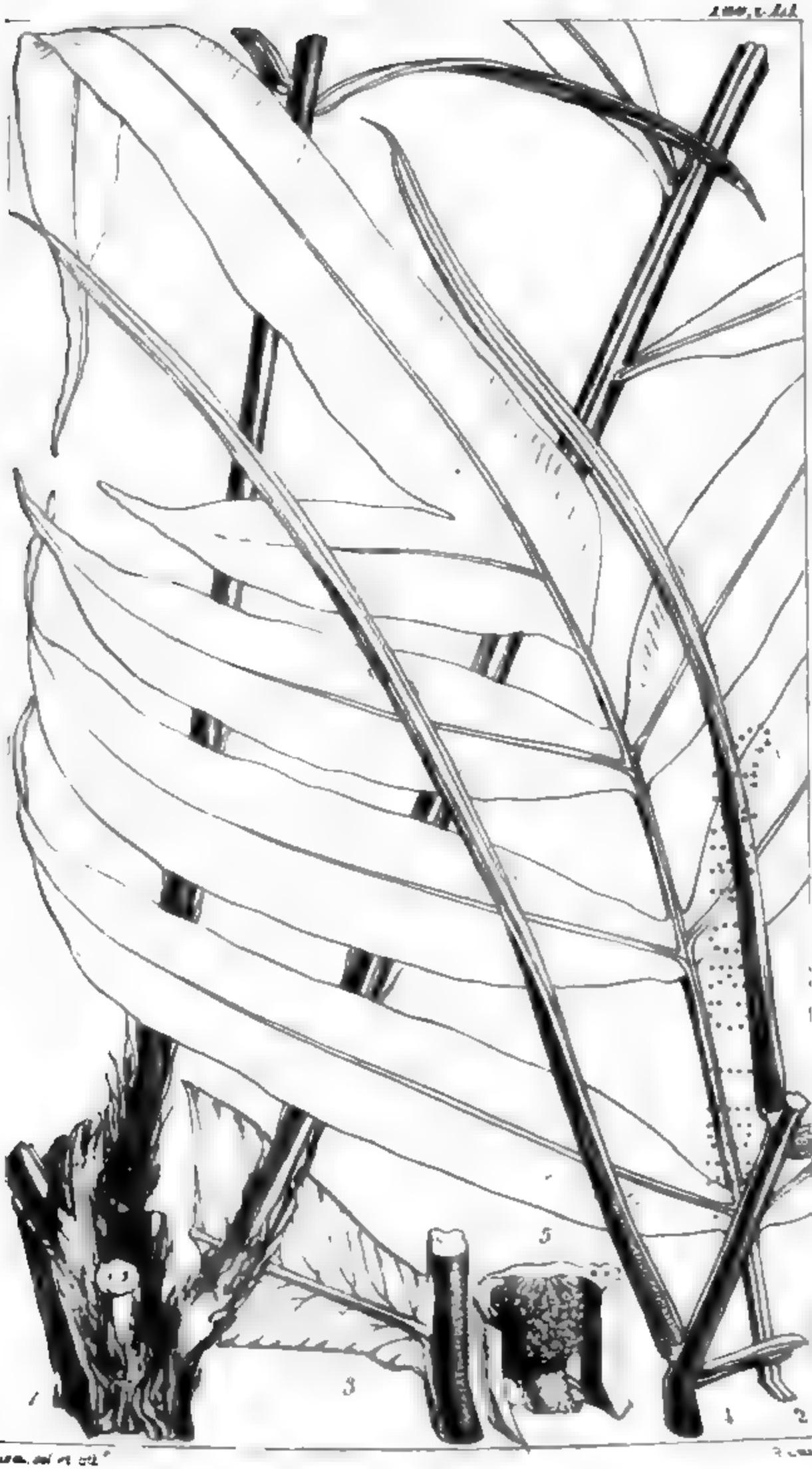
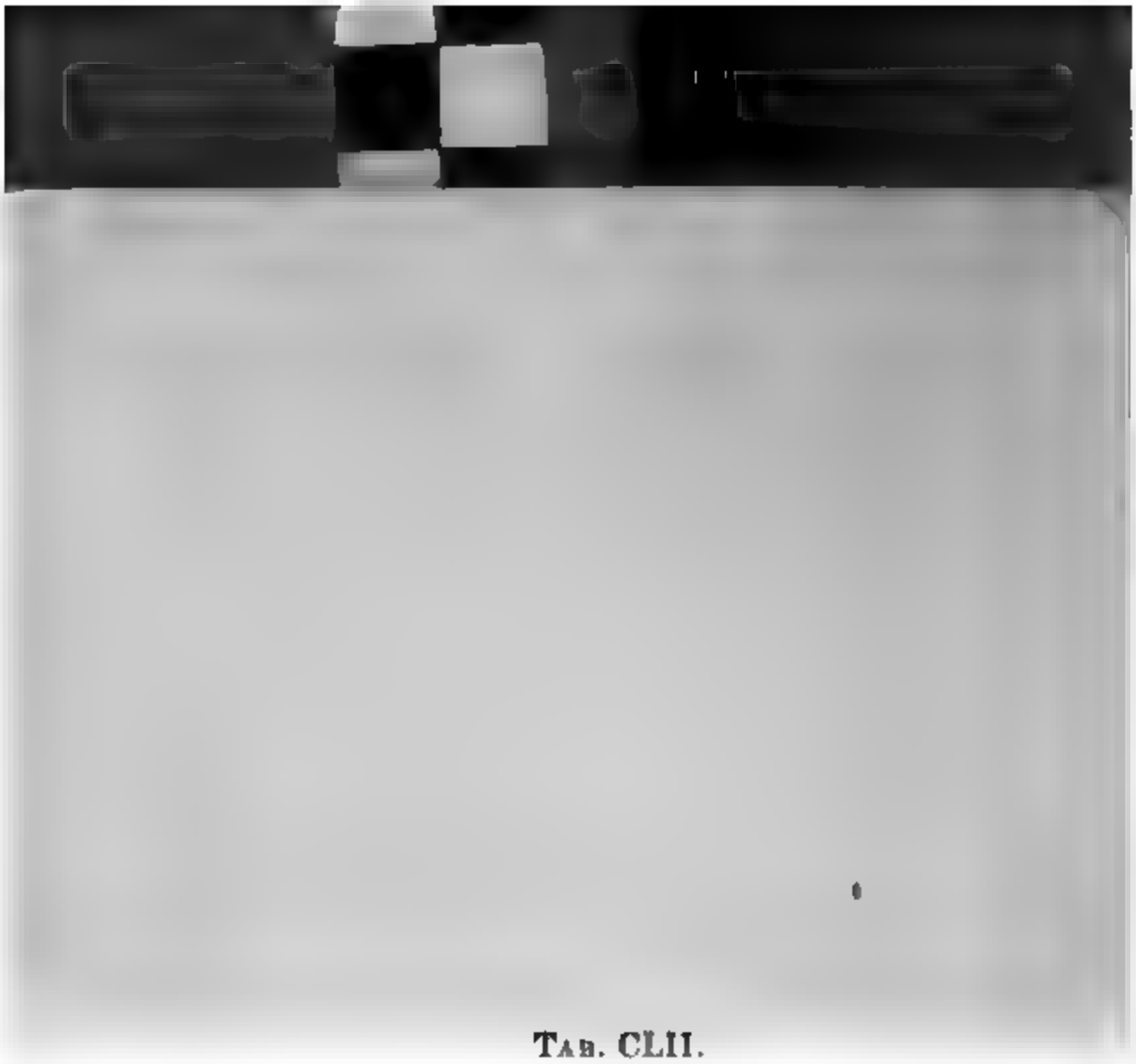
TAB. CLI.

LOMARIA CUSPIDATA, *Kze.*—p. 30.

Fig. 1. Portion of the caudex, with the inferior portion of a sterile and fertile frond and their stipites. Fig. 2. Upper portion of a sterile frond; *nat. size.* Fig. 3. Base of a sterile pinna, showing the adnate and decurrent attachment to the rachis; *magnified.* Fig. 4. Portion of a rachis, with fertile pinnæ; *nat. size.* Fig. 5. Portion of a fertile pinna *magnified.*

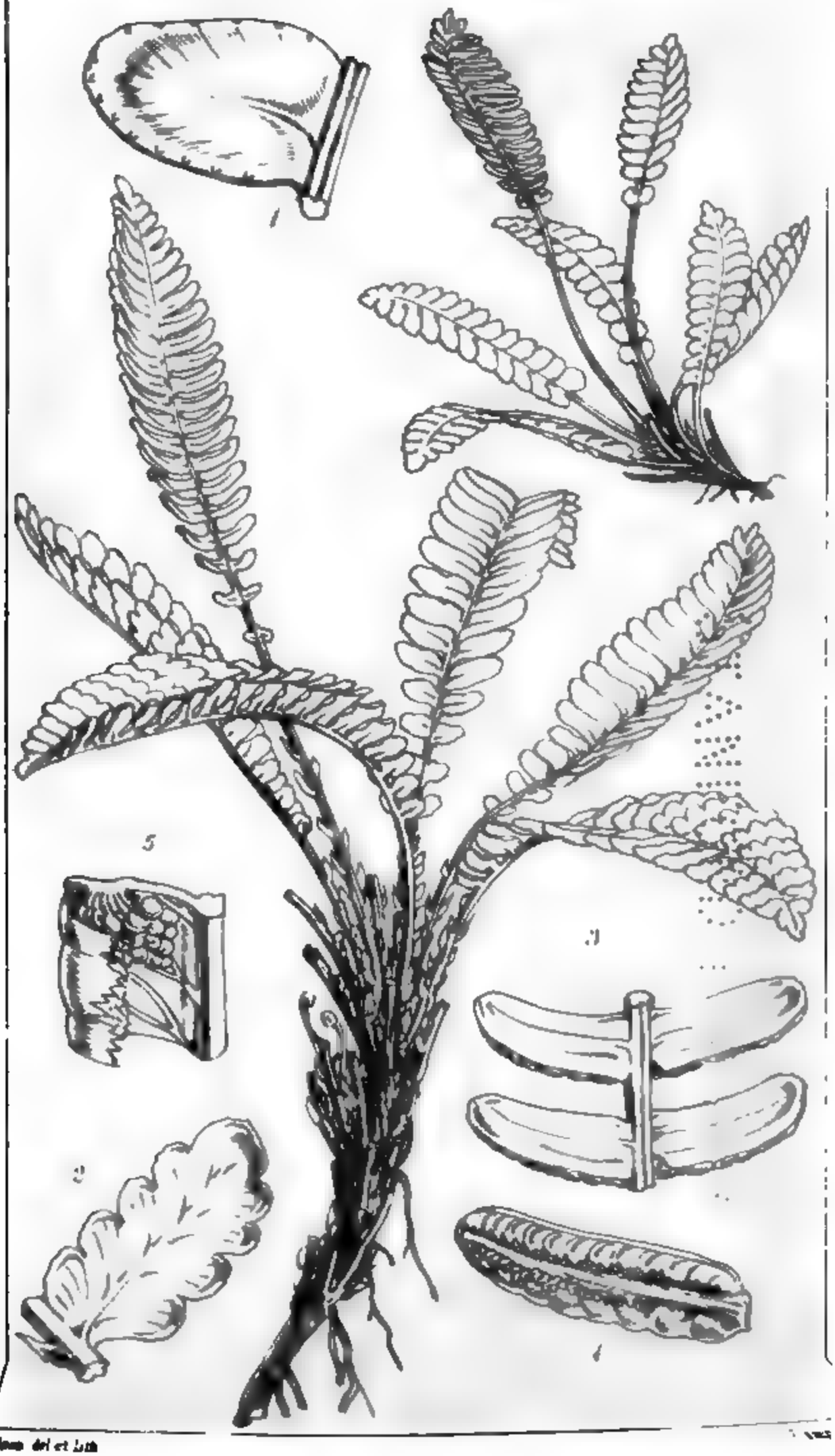




TAB. CLII.

LOMARIA GERMAINII, *Hook.*—p. 31.

Two plants, with sterile and fertile fronds; *nat. size.* Fig. 1 and 2. Sterile pinnæ, *magnified.* Fig. 3. Portion of a rachis, with fertile pinnæ, seen from above; *magnified.* Fig. 4. Fertile pinna, seen from beneath; *more magnified.* Fig. 5. Transverse section of the same; *still more magnified.*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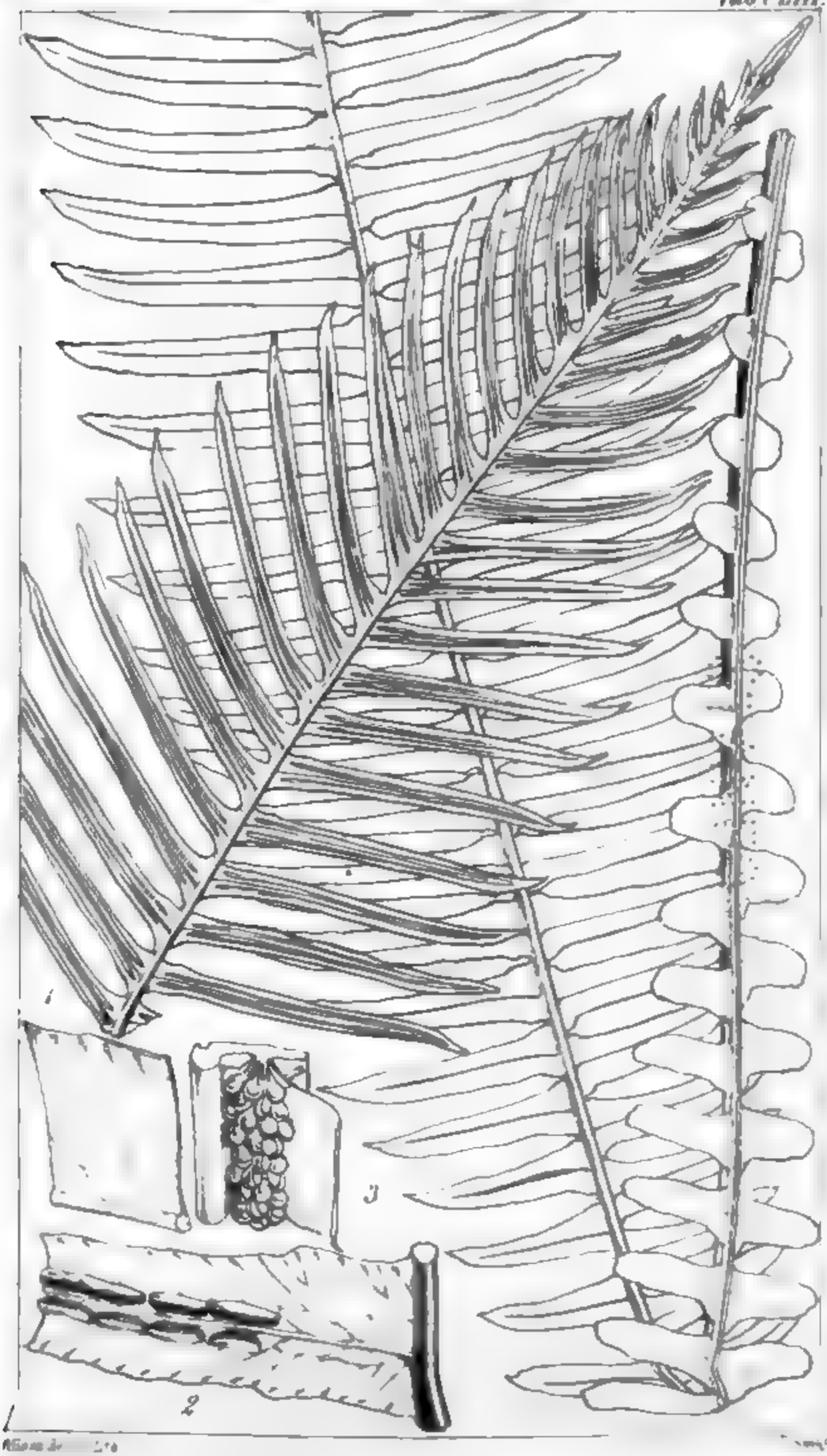
Tab. CLIII.

Blechnum doodioides, *Hook.*—p. 60.

Portion of a sterile frond, and the superior portion of a fertile frond, seen from beneath; *nat. size*. Fig. 1. Portion of a sterile segment, showing the venation; *magnified*. Fig. 2. Portion of a fertile segment, showing the venation, the partial anastomosing of the veins, and the interrupted *Doodia*-like sori; *magnified*. Fig. 3. Small portion of a fertile segment, with sorus and involucres; *magnified*.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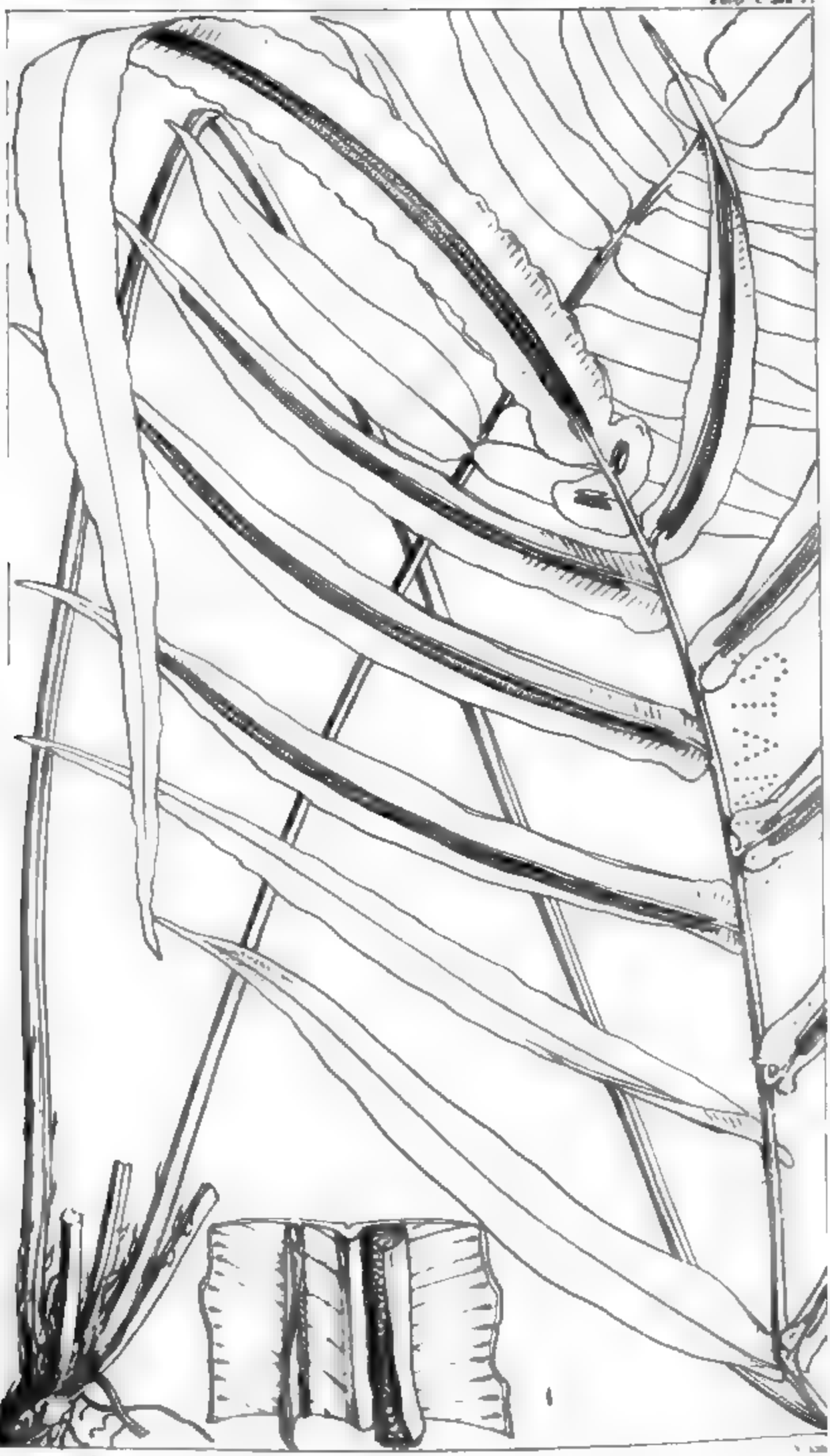
TAB. CLIV.

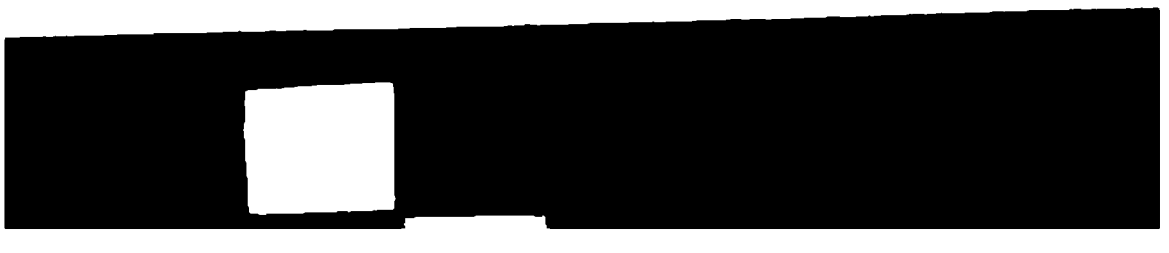
BLECHNUM LONGIFOLIUM, *H.B.K.*—p. 49.

Sterile and fertile frond, seen from beneath; *nat. size.* Fig. 1.

Portion of a fertile pinna, seen from beneath; *magnified.*

Tab CLIV.

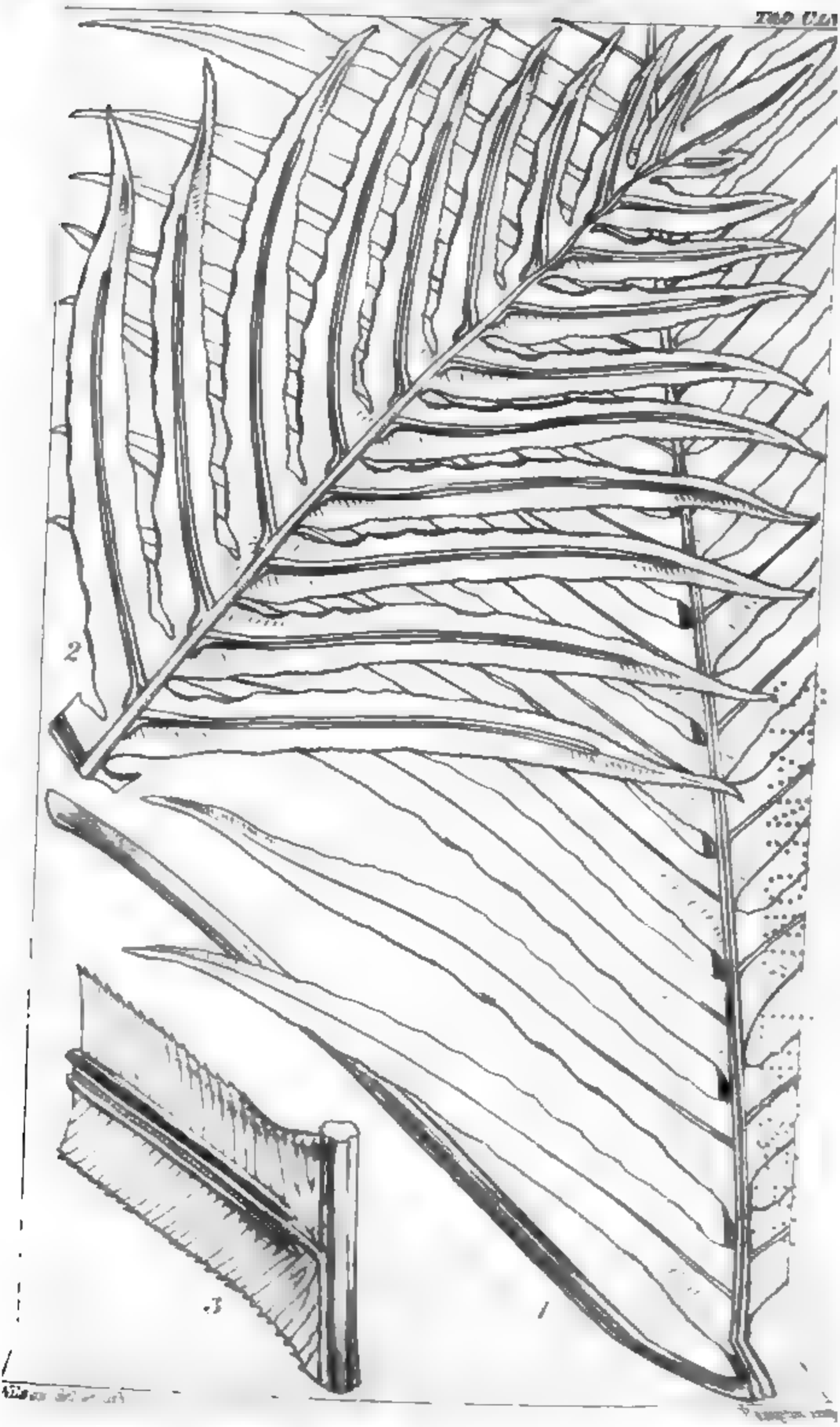




Tab. CLV.

Blechnum nitidum, *Pr.*—p. 44.

Fig. 1. Portion of a fertile frond; and Fig. 2. Portion of a fertile frond, seen from beneath; *nat. size.* Fig. 3. Portion of a fertile segment, seen from beneath; *magnified.*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Tab. CLVI.

Blechnum nitidum, *Pr.*—Var. *contracta*, Hook.—p. 44.

Portions of a fertile frond, seen from beneath; *nat. size.* Fig. 1. Fertile pinna, seen from beneath; *magnified.* Fig. 2. Portion of a fertile pinna, seen from beneath, and the venation; *more highly magnified.*

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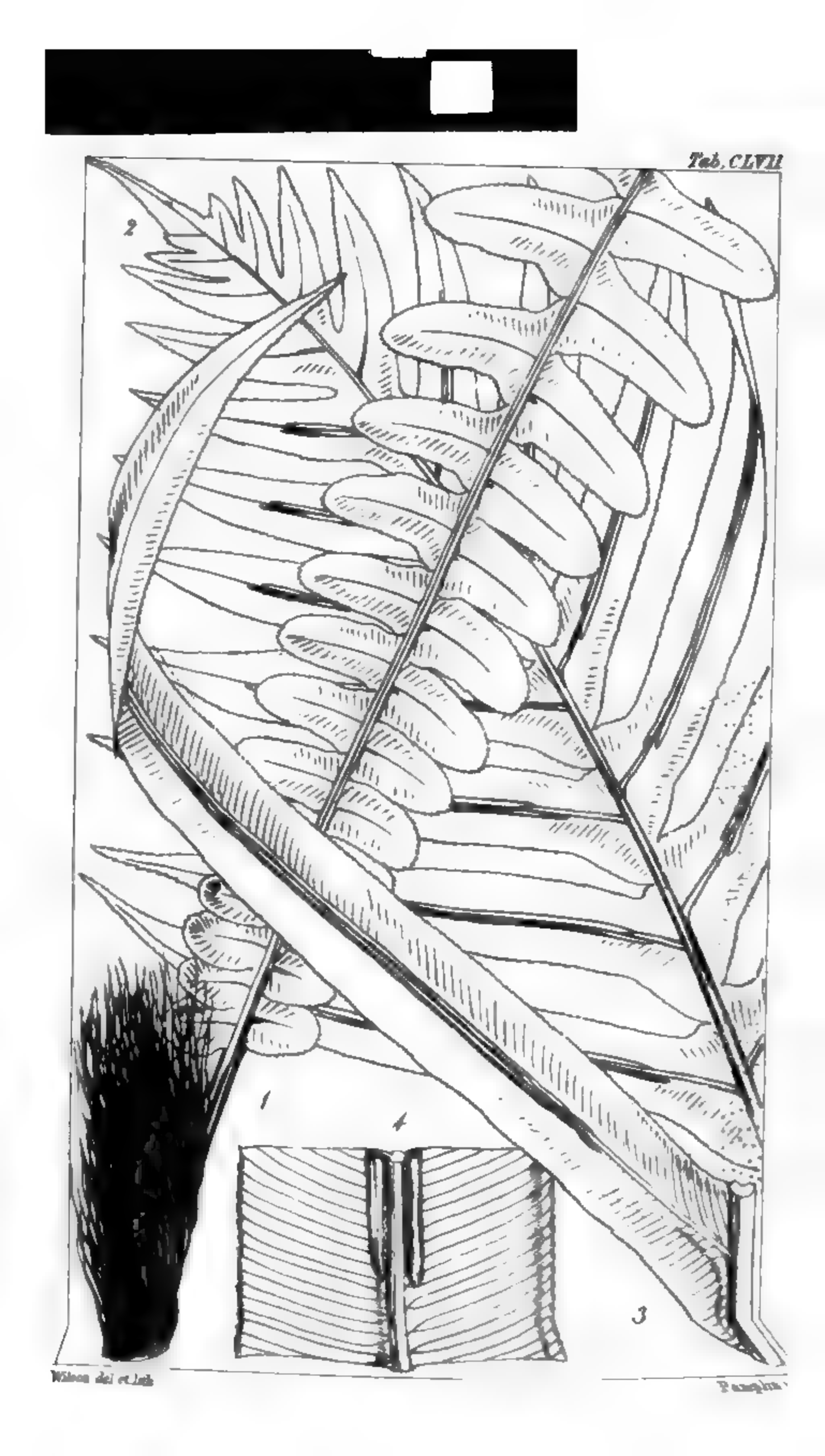
TAB. CLVII.

BLECHNUM BRASILIENSE, *Desv.*—p. 42.

Fig. 1. Base of a frond, with its short stipes, together with the long crinite scales which invest the base of the stipes and the apex of the caudex; *nat. size.* Fig. 2. Apex of a fertile frond; *nat. size.* Fig. 3. Fertile segment, from the broadest part of the frond; *nat. size.* Fig. 4. Portion of fertile pinna, seen from beneath; *magnified.*


Tab. CLVII
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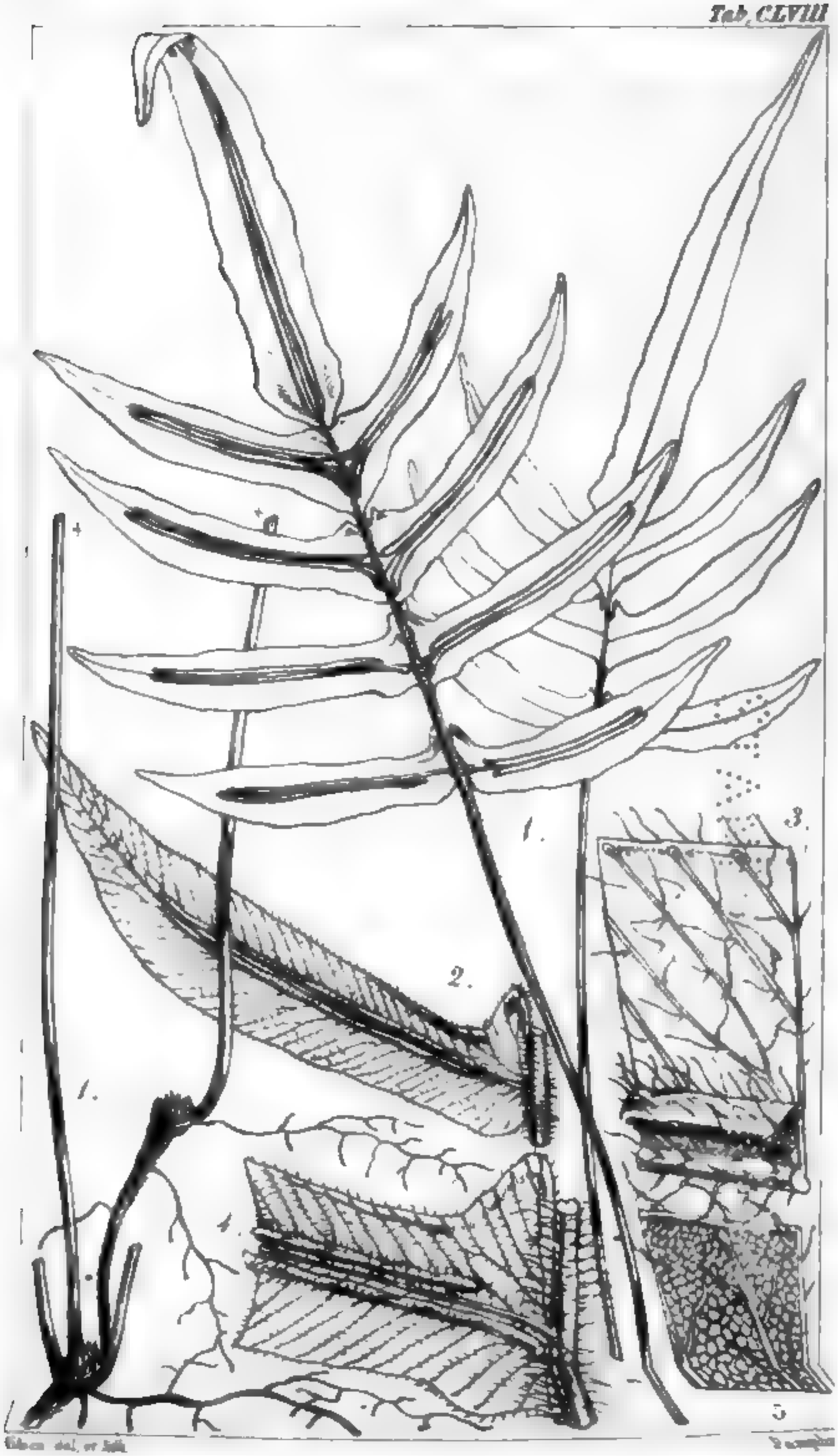
Wilson del et lith
Pamplin

TAB. CLVIII

BLECHNUM FENDLERI, *Hook.*—p. 48

Fig. 1 Entire plant, fertile; *nat size*. Fig. 2. Fertile pinna seen from beneath, *magnified*. Fig. 3. Portion of a fertile pinna; *more magnified* Fig 4. Base of a fertile pinna; *magnified*. Fig. 5. Small portion of a pinna, to show the pellucidly dotted structure; *more magnified*.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TAB. CLIX.

BLECHNUM STRIATUM, *Br.*—p. 55.

Fig. 1. Base of a sterile frond, seen from beneath; *nat. size.* Fig 2 Upper portion of a fertile frond; *nat. size.* Fig. 3. Portion of a sterile pinna, *magnified.* Fig. 4. Portion of a fertile pinna, seen from beneath; *magnified.*

Tab. CLD
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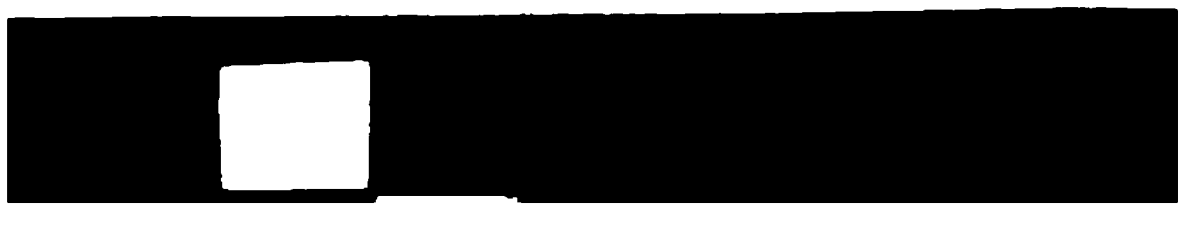
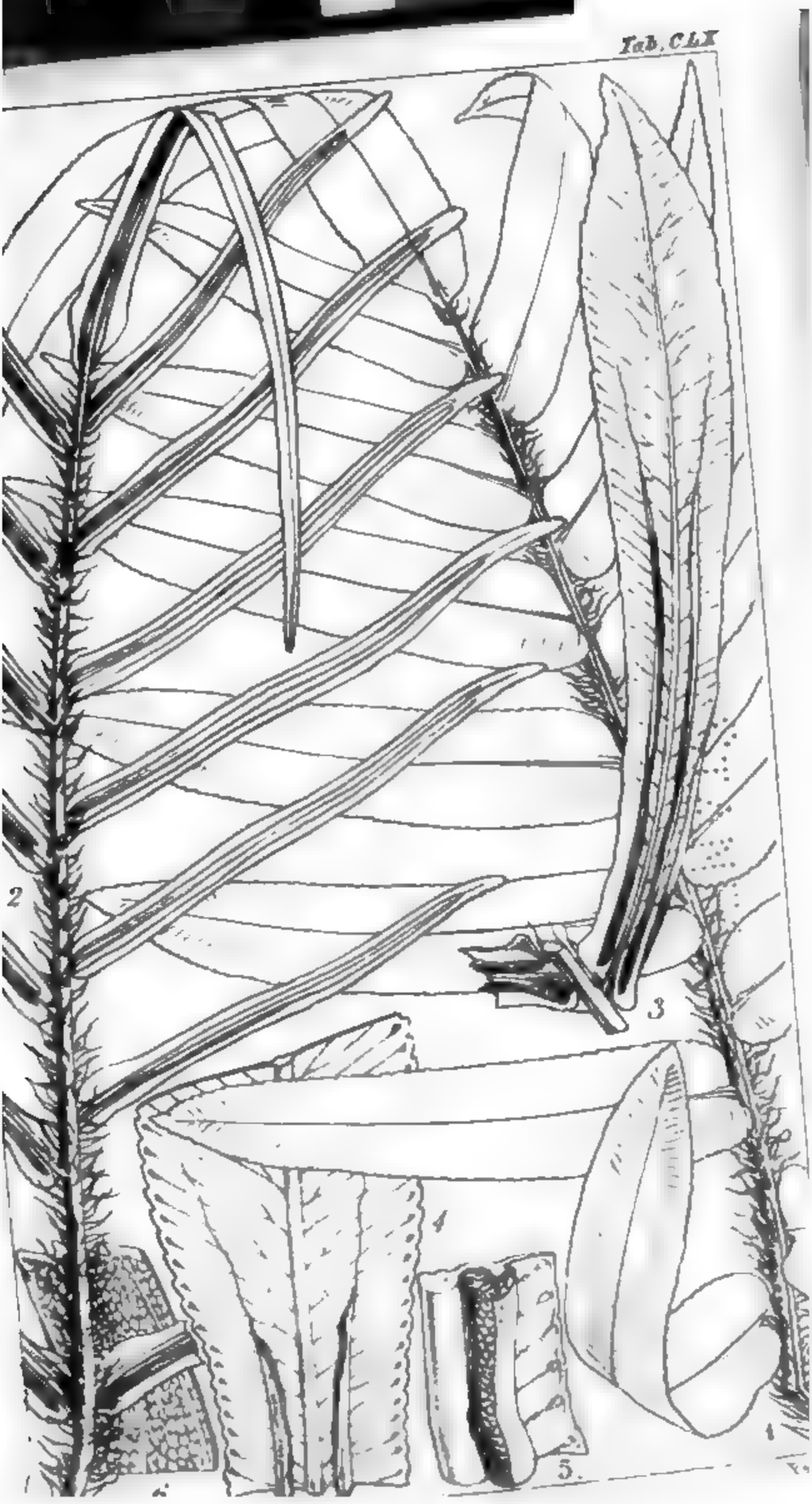


Tab. CLX.

Blechnum lævigatum, *Cav.*—p. 55.

Fig. 1 and 2. Portion of a sterile and fertile frond; *nat. si*
Fig. 3. A rather unusually broad fertile pinna, seen fro
beneath; *magnified.* Fig. 4 Portion of the same, showi
an extension of the receptacle of the fructification beyo
the sorus, *more magnified.* Fig. 5. Portion of a soru
still more magnified. Fig. 6. Portion of a sterile pinn
highly magnified, to show its pellucidly dotted character.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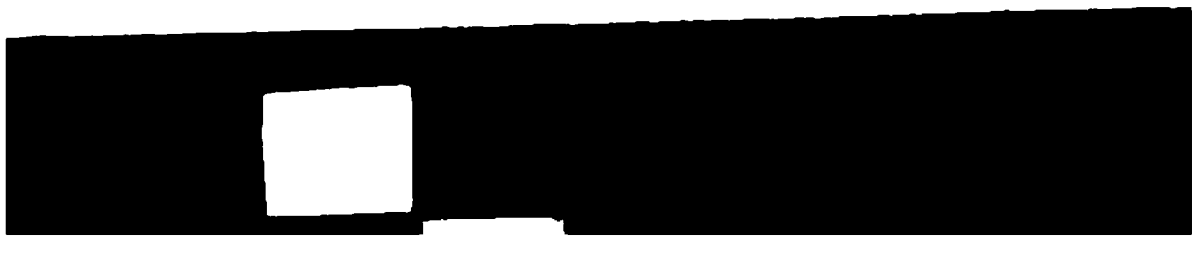


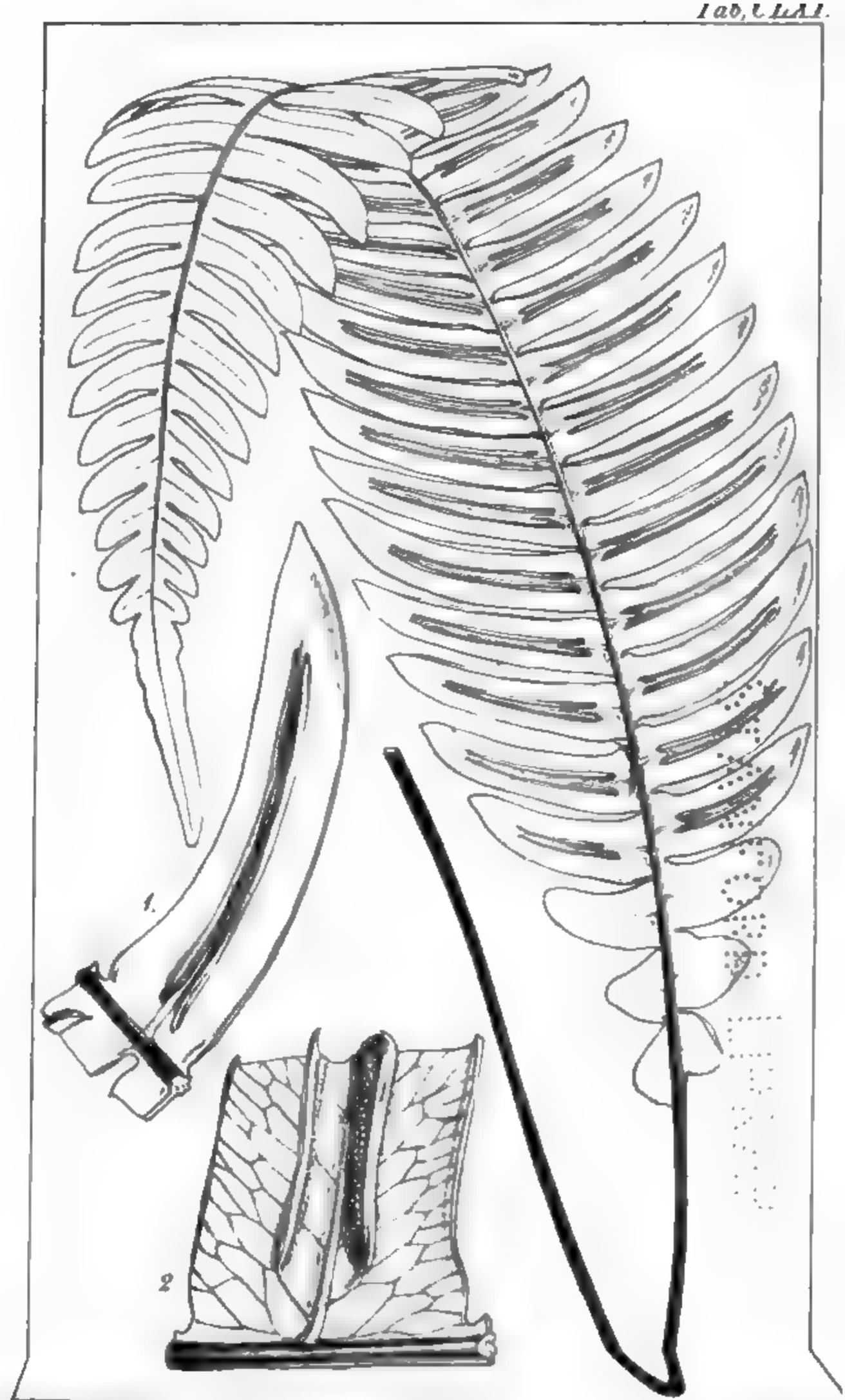
Tab. CLXI.

Blechnum melanopus, *Hook.* -p. 64.

Fertile frond, *nat. size.* Fig. 1. Fertile segment, seen fi
beneath; *magnified.* Fig 2. Portion of a fertile segm
showing the venation; *more highly magnified.*

[redacted]

Tab. CLXI.



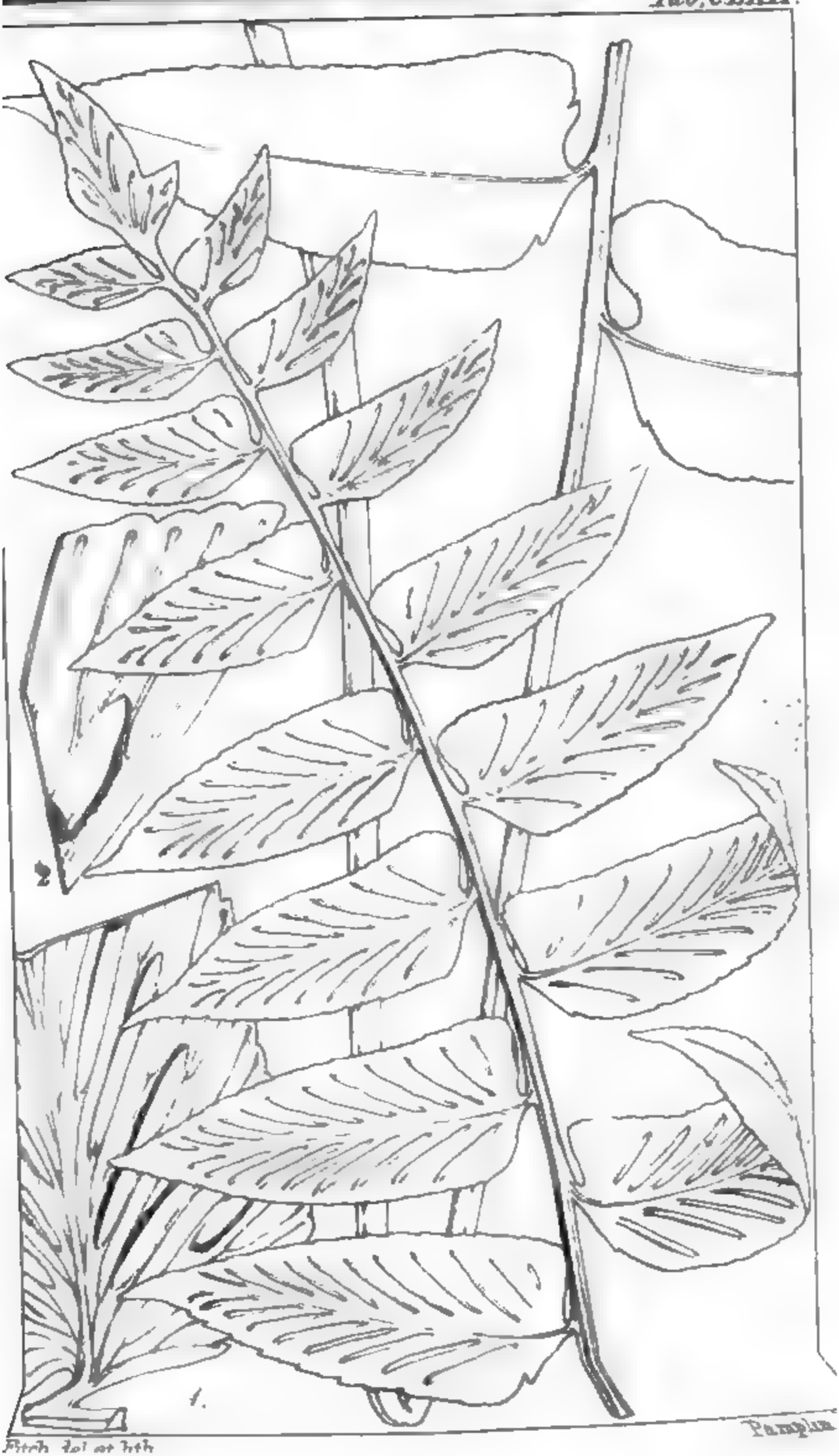
Pitch del. et lith.

Pamphin, sc.

TAB CLXII.

ASPLENIUM (EUASPLENIUM) VOMERIFORME, *Hook.*—p. 109.
Fertile frond; *nat. size.* Fig 1 and 2. Portions of fertile pinnæ; *magnified.*

Tab. CLXII.

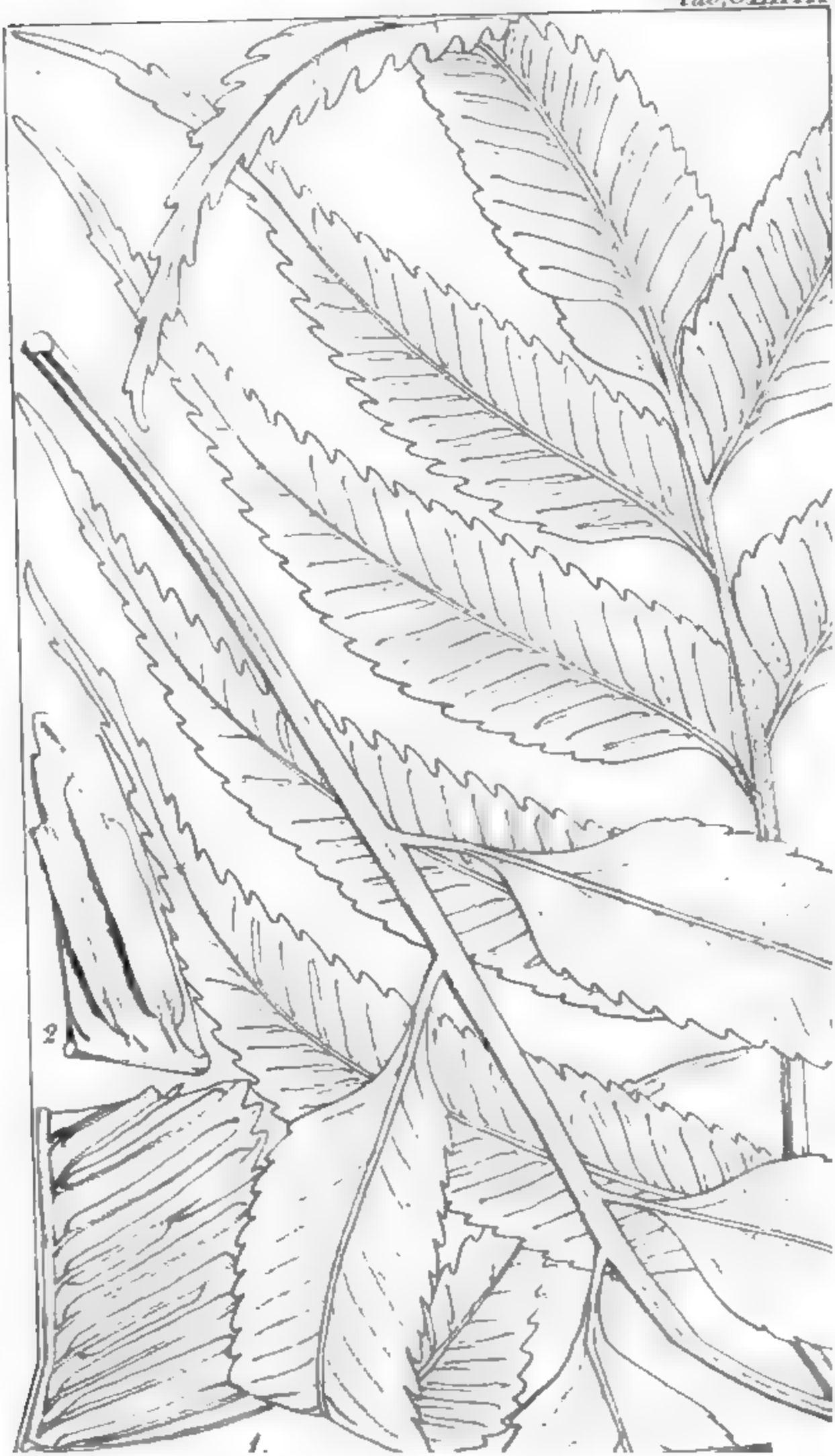


Fitch del et lith

TAB. CLXIII.

[illegible] (E[illegible]ASPLENIUM) WALKERÆ. *Hook.*—p. 108.

[illegible] *nat. size.* Fig. 1. Portion of a fertile pinna; [illegible]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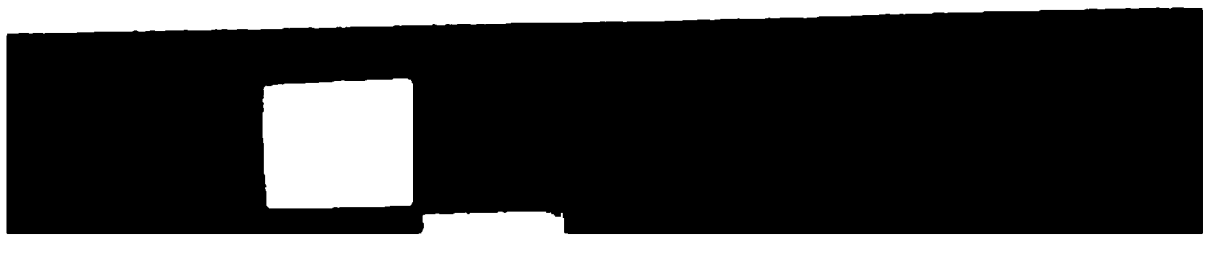

TAB. CLXIV.

A. ASPLENIUM (EUASPLENIUM) CONCOLOR, *Hook.*—p. 88.
Fertile plant; *nat. size.* Fig. 1. Portion of a fertile frond, *magnified.*

B. ASPLENIUM (DIPLAZIUM) SUBSERRATUM.—See Vol. IV
Fertile frond, *nat. size* Fig. 1. Portion of ditto; *magnified.*

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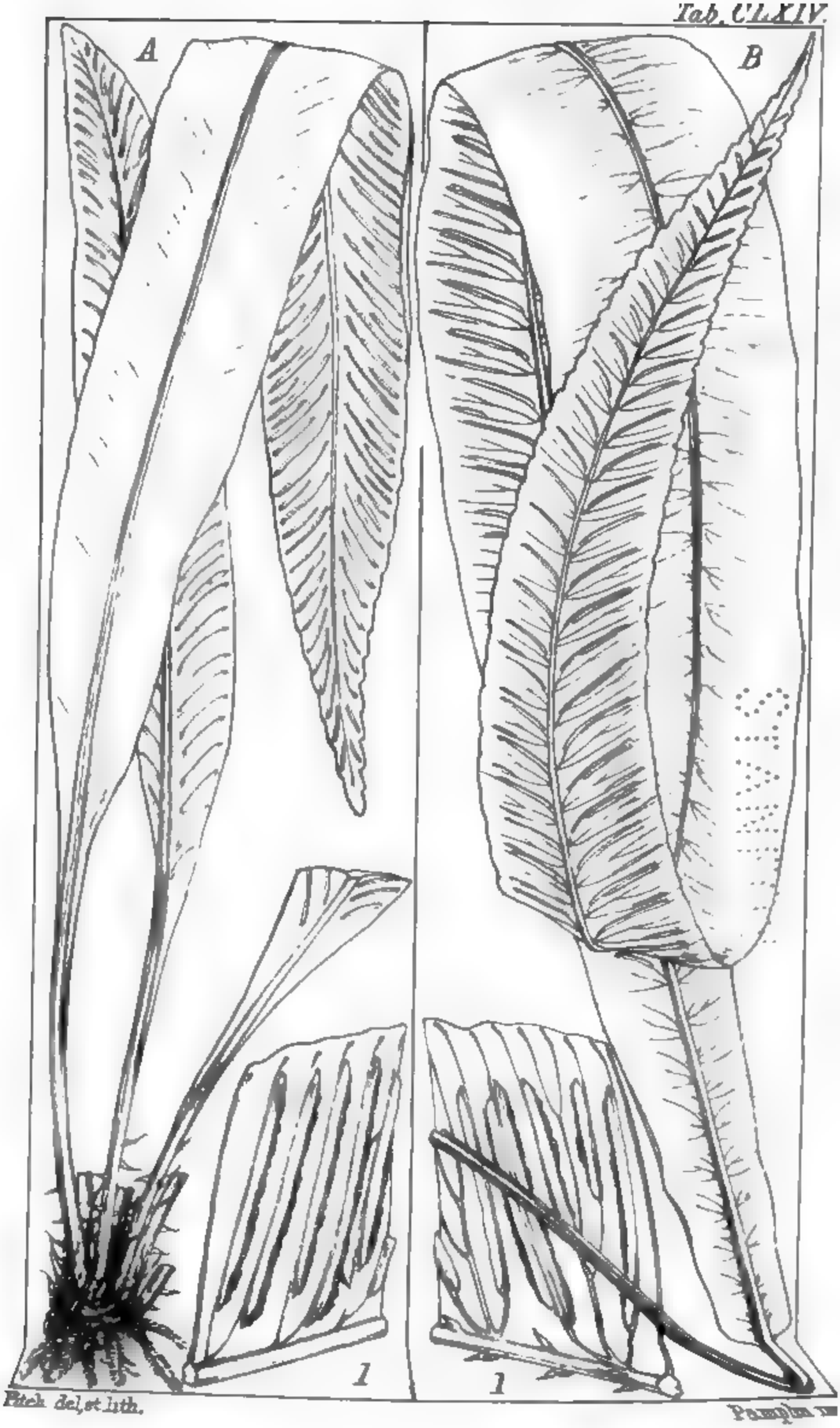
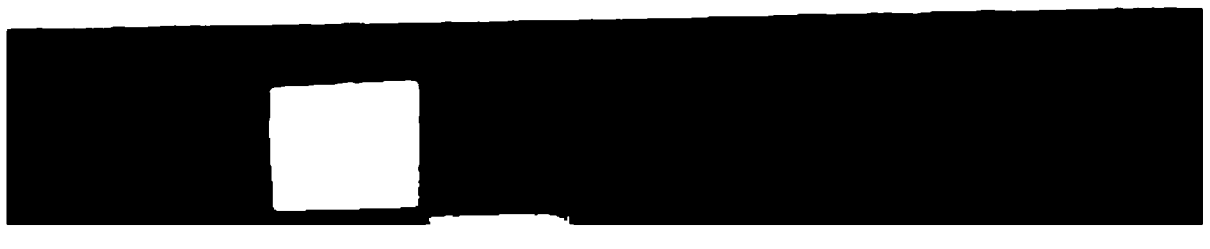
Tab. CLXIV.



Pitch del, et lith.

Pamplin sc



TAB. CLXV.

ASPLENIUM (EUASPLENIUM) SALIGNUM, *Bl.*—p. 95.

Fertile frond; *nat. size*. Fig. 1. Portion of the rachis, with the base of a fertile pinna. Fig. 2, 3. Portions of fertile pinnæ. Fig. 4. Capsule; *more or less magnified*.

Pitch del, et lith

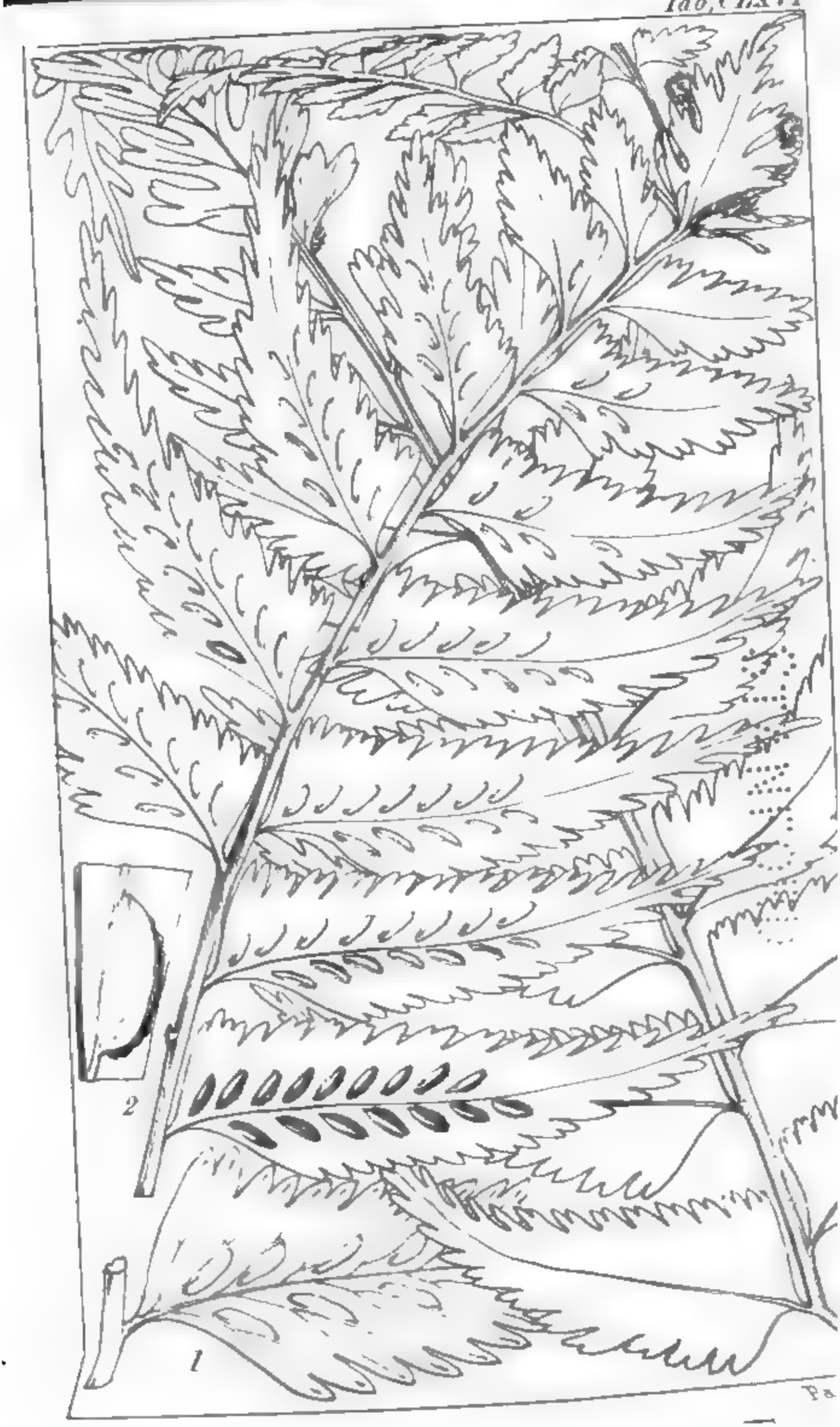
Pamphn.

TAB. CLXVI.

ASPLENIUM (EUASPLENIUM) ANISOPHYLLUM, *Kze.*, var. *latifolium*.—p. 111.

Fertile frond; *nat. size*. Fig. 1 and 2. Fertile pinna and sorus, *magnified*.

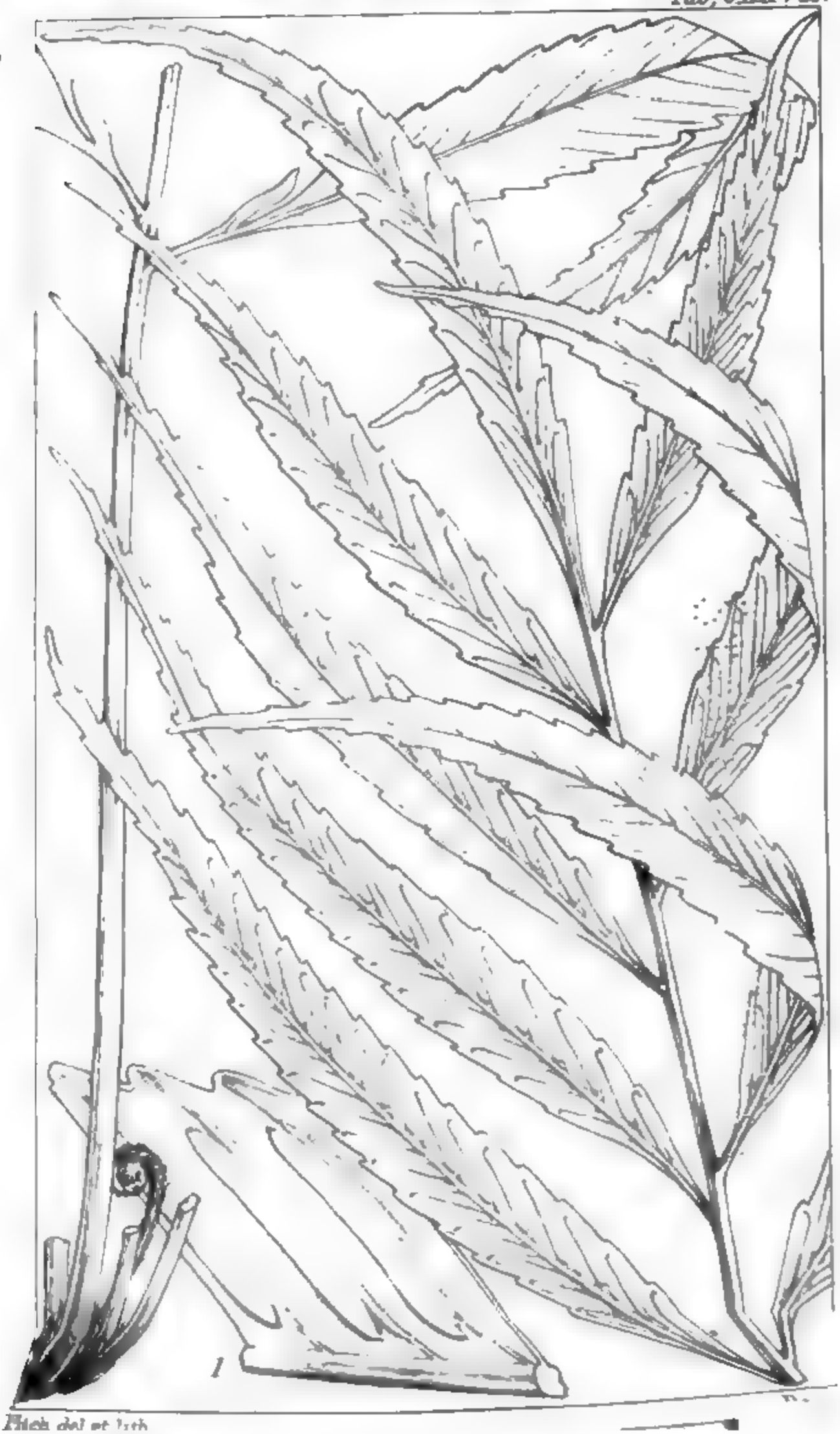
Tab. CLXVI



TAB. CLXVII.

ASPLENIUM (EUASPLENIUM) WIGHTIANUM, *Wall.*—p. 105.
Fertile frond; *nat. size.* Fig. 1. Portion of a fertile pinna; *magnified.*

Tab, CLXVII.



Fitch del et lith

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Tab CLXVIII.

Asplenium (Euasplenium) Sumatranum, *Hook.*—p. 110.

Fertile frond; *nat. size.* Fig. 1. Portion of a fertile pinna; *magnified.*

[redacted]

Tab CLXVIII

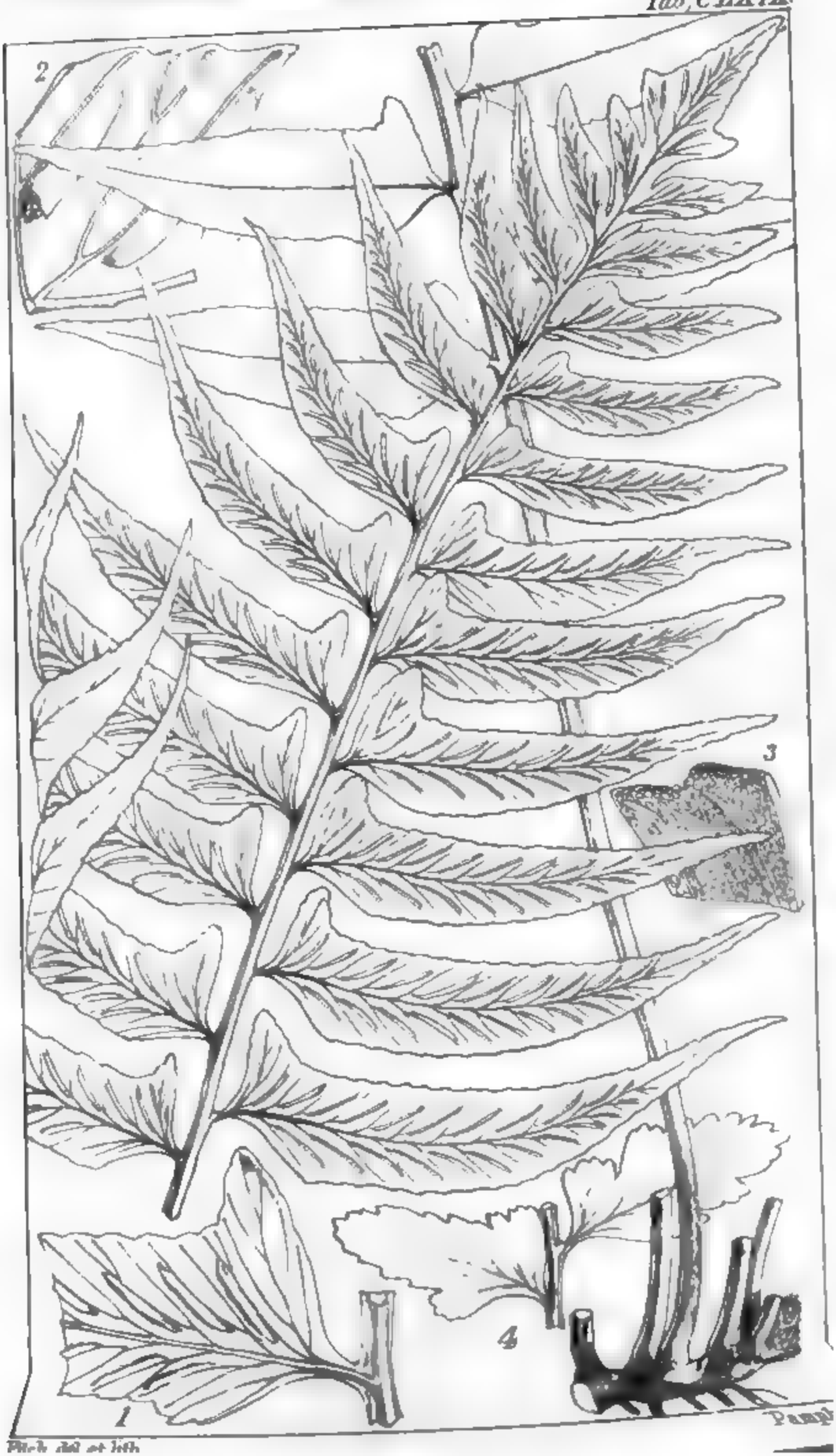
Pach del, et lith.

Tab. CLXIX.

Asplenium (Euasplenium) riparium, *Liebm.*—p. 119.

Fertile frond; *nat. size.* Fig. 1, 2. Portions of fertile pinnæ. Fig. 3. Portion of a pinna to show the minutely cellular structure; *magnified.* Fig. 4. Pinnæ of var. *obtusifolium* (*A. obtusifolium*, L.); *nat. size.*

Tab. CLXIX.



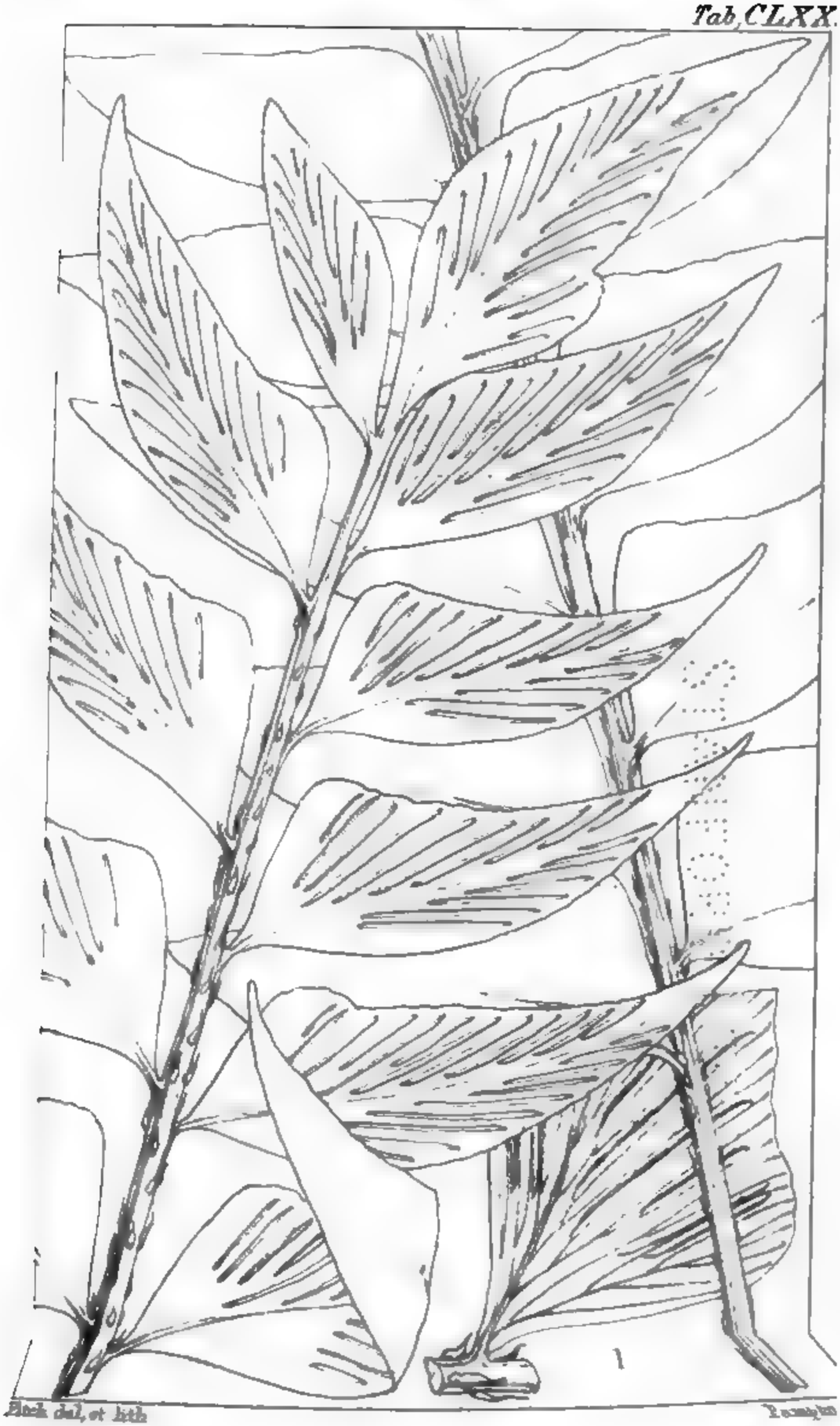
Pitch del et lith

Tab. CLXX.

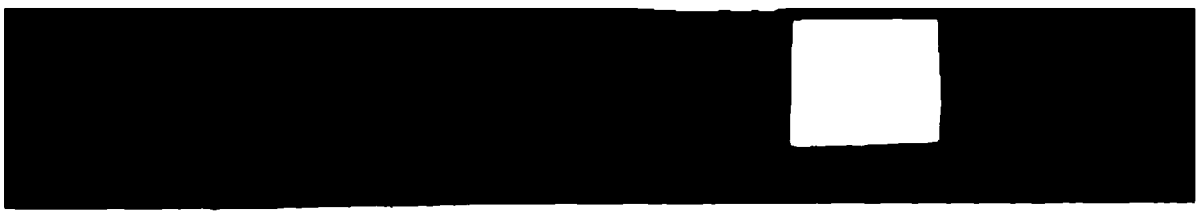
Asplenium (Euasplenium) zamioides, *Hook.* —p 114
Fertile frond, *nat. size* Fig 1 Fertile pinna, *magnified*

[redacted]

Tab. CLXX.



Pitch del. et lith.



TAB. CLXXI.

ASPLENIUM (EUASPLENIUM) AURICULATUM, *Sw.*—p. 118.

Fertile frond; *nat. size.* Fig. 2. Portion of a fertile pinna, *magnified.*

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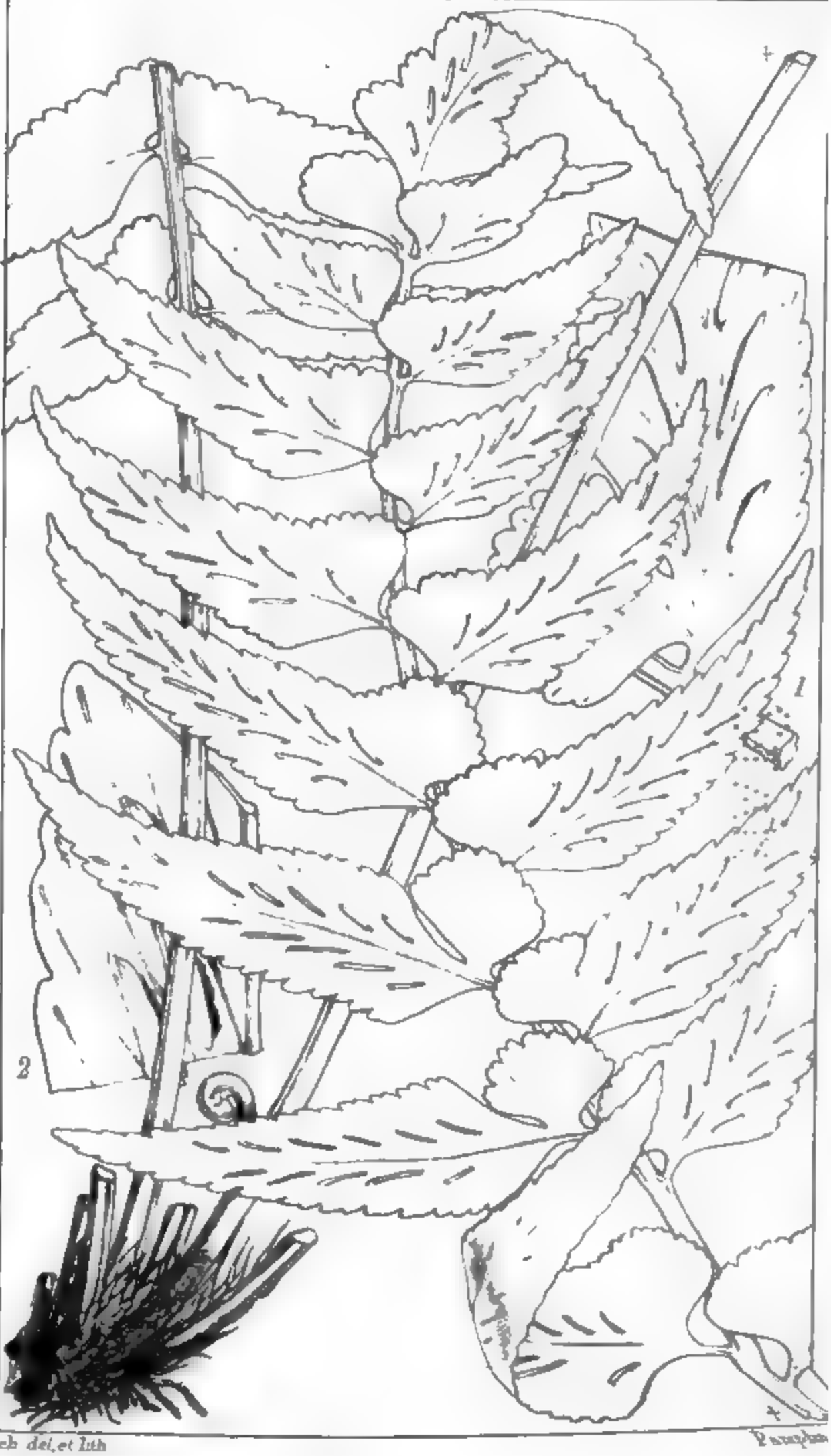
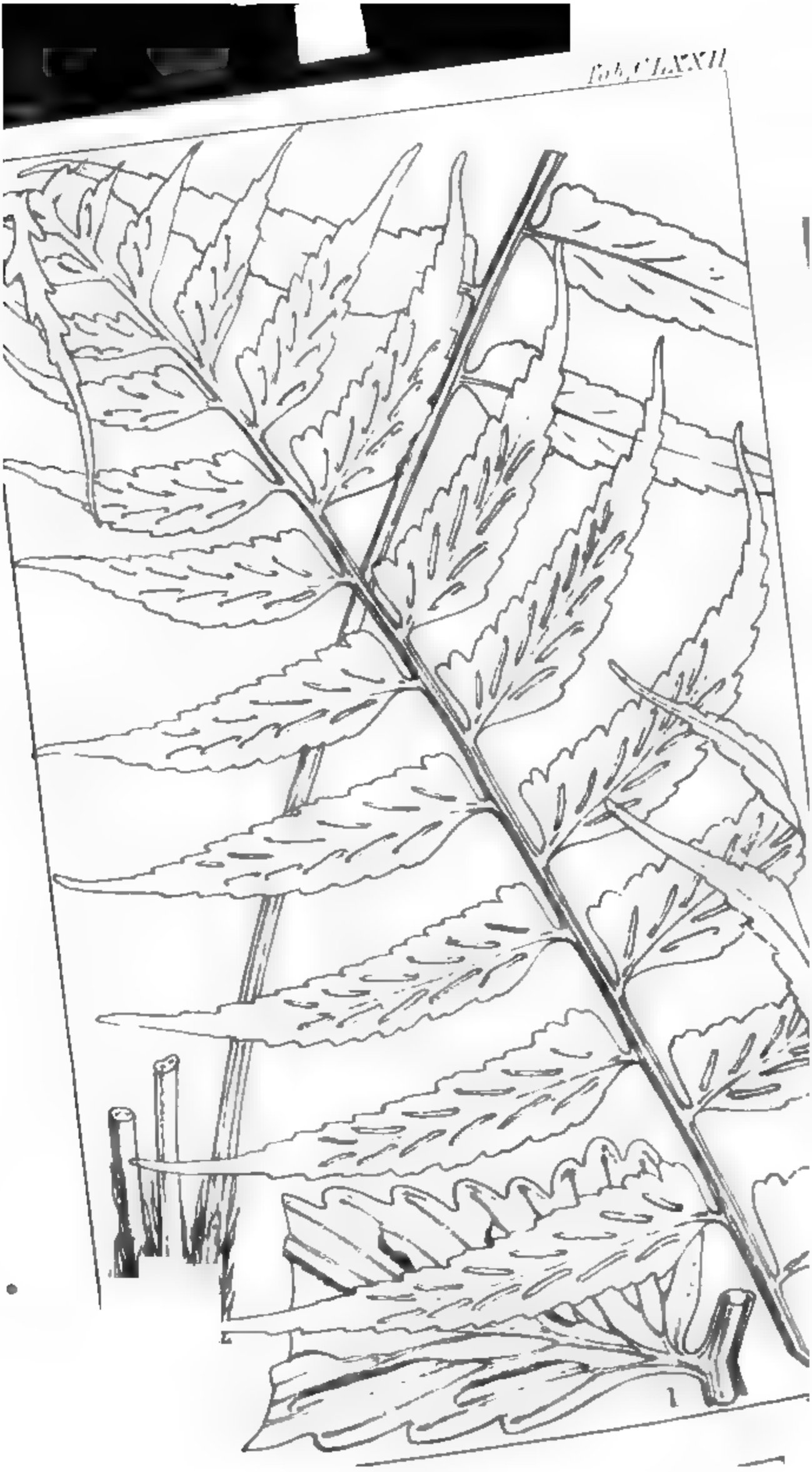
Tab. CLXXI

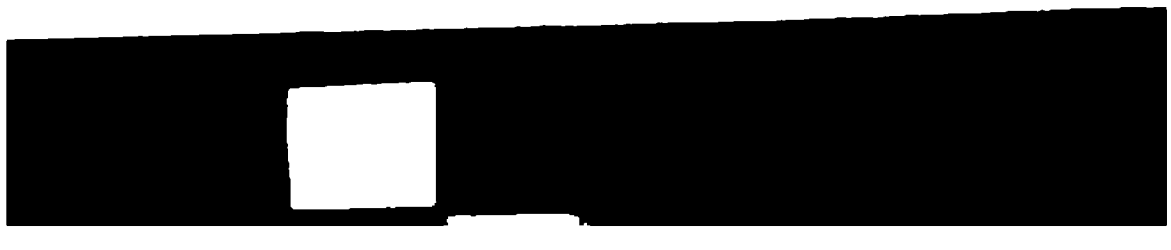


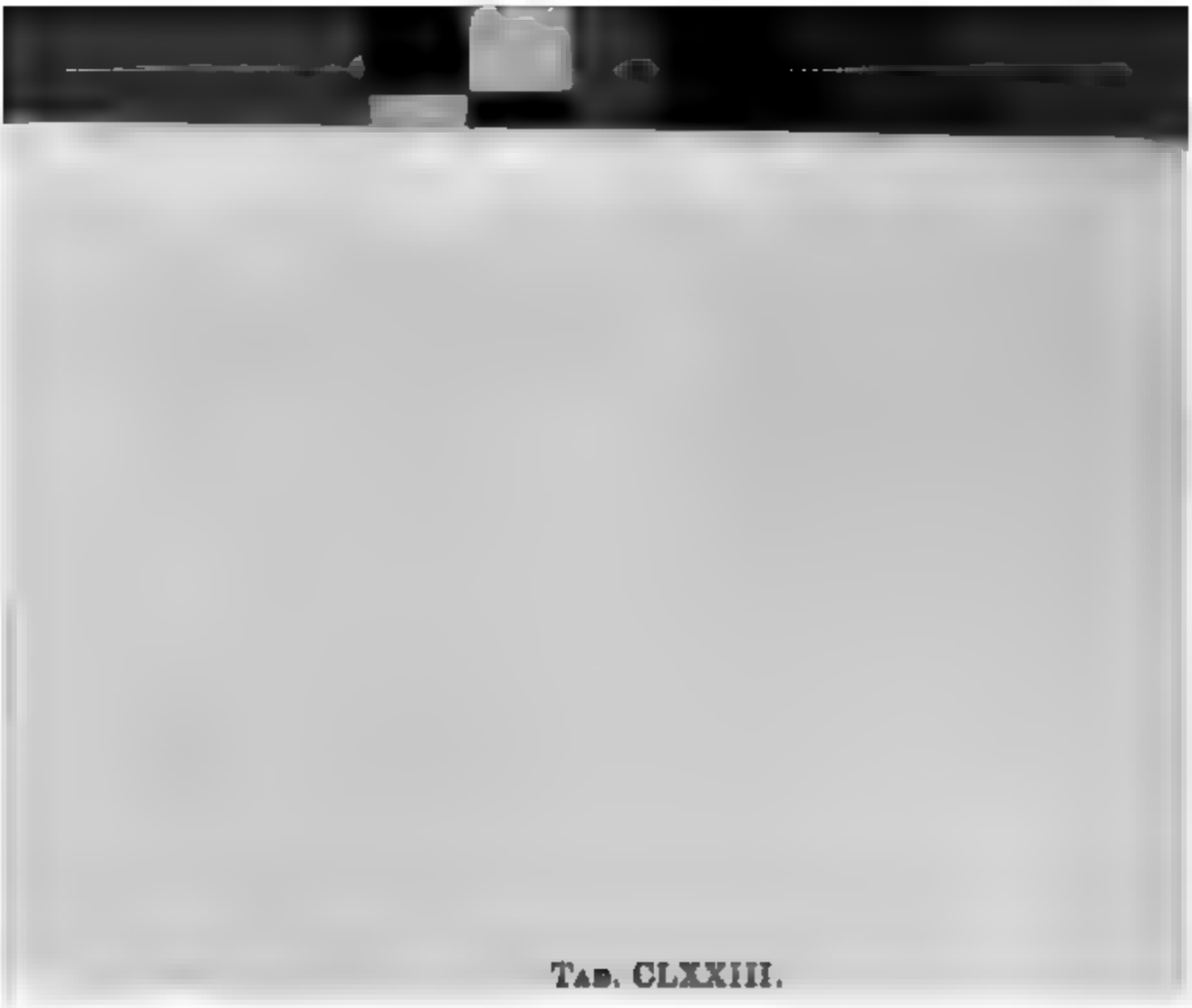
Fitch del. et lith.

Tab. CLXXII.

Asplenium (Euasplenium) hastatum, *Kl.*—p. 116.
Fertile frond, *nat. size.* Fig. 1. Portion of a fertile frond, *magnified.*



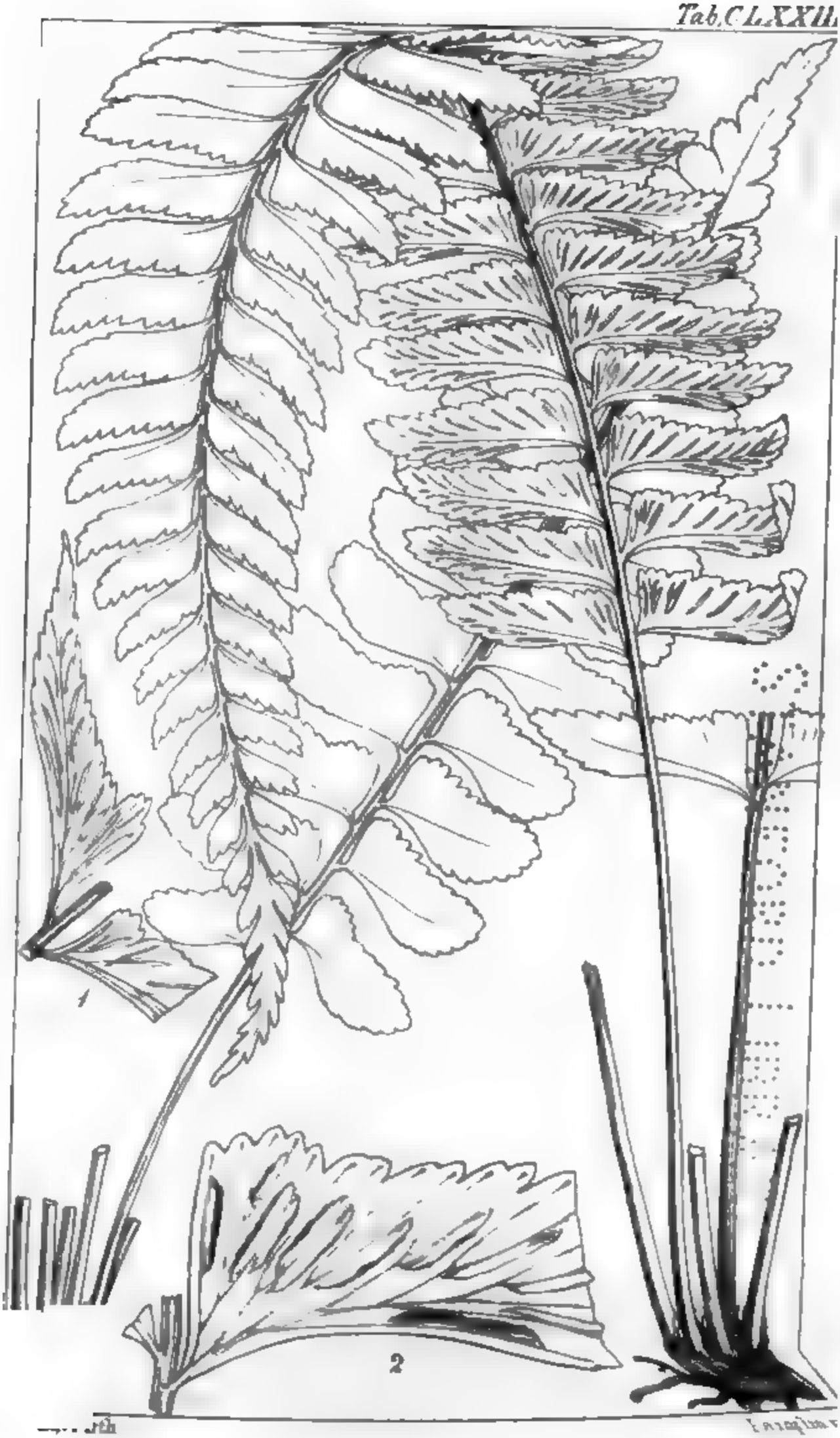




TAB. CLXXIII.

ASPLENIUM (EUASPLENIUM) LÆTUM, *Sw.*—p. 133.

Fertile fronds, and Fig. 1, var. with narrow acuminated pinnæ; *nat. size*. Fig. 2. Portion of a fertile pinna; *magnified*.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TAB. CLXXIV.

ASPLENIUM (EUASPLENIUM) FIRMUM, *Kze.*—p. 134.
Fertile fronds, *nat. size.* Fig 1. Fertile pinna. Fig 2. Portion of ditto; *magnified.*

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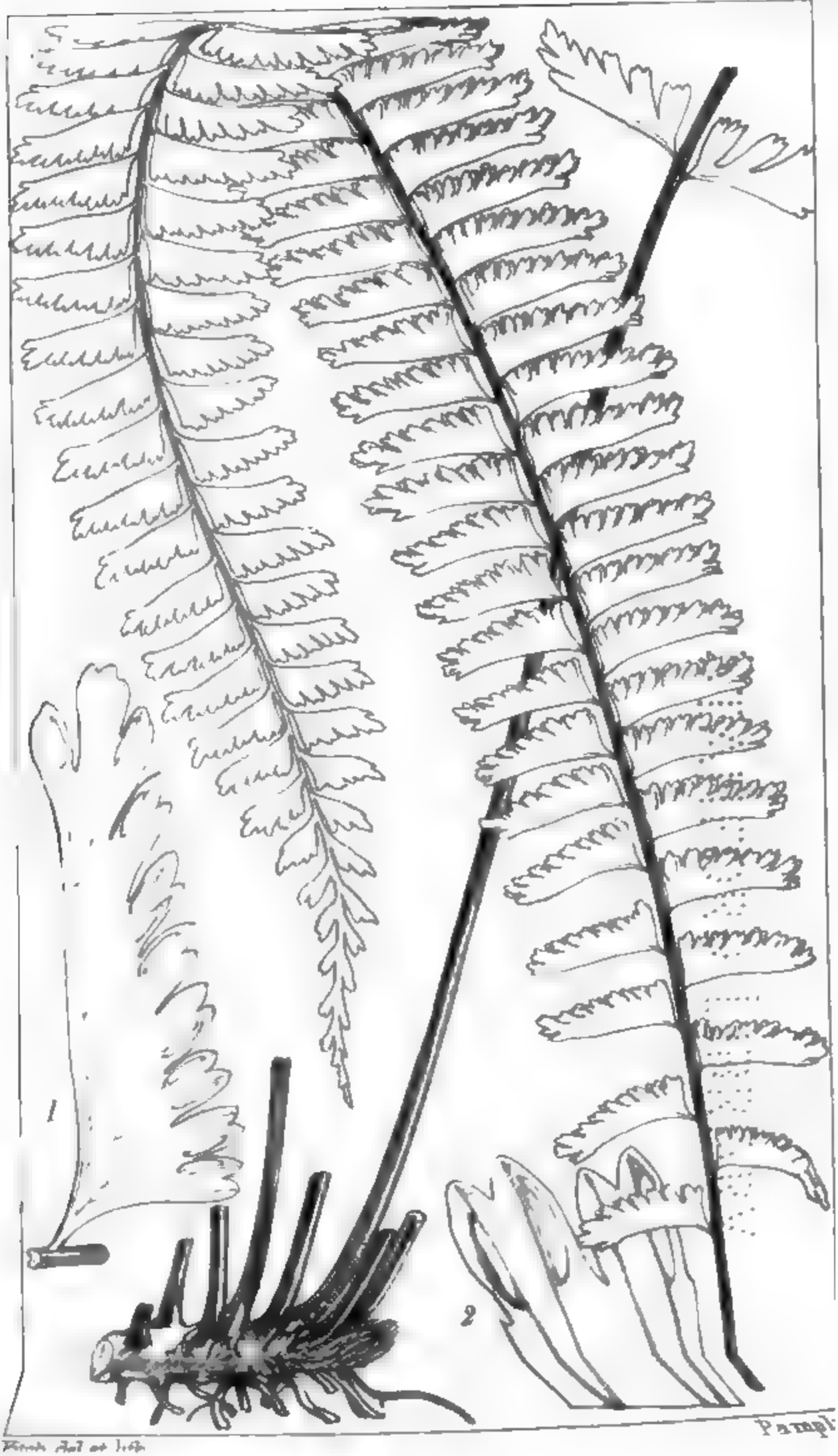
Tab. CLXXV.

Asplenium (Euasplenium) heterocarpum, *Wall.*—p. 132.
Fertile frond; *nat. size.* Fig. 1. Fertile pinna. Fig. 2. Sori; *magnified.*

Tab, CLXXV



Tab. CLXXVI.

Asplenium (Euasplenium) macrosorum, *Kze.*—p. 93.

Fertile frond; *nat. size.*

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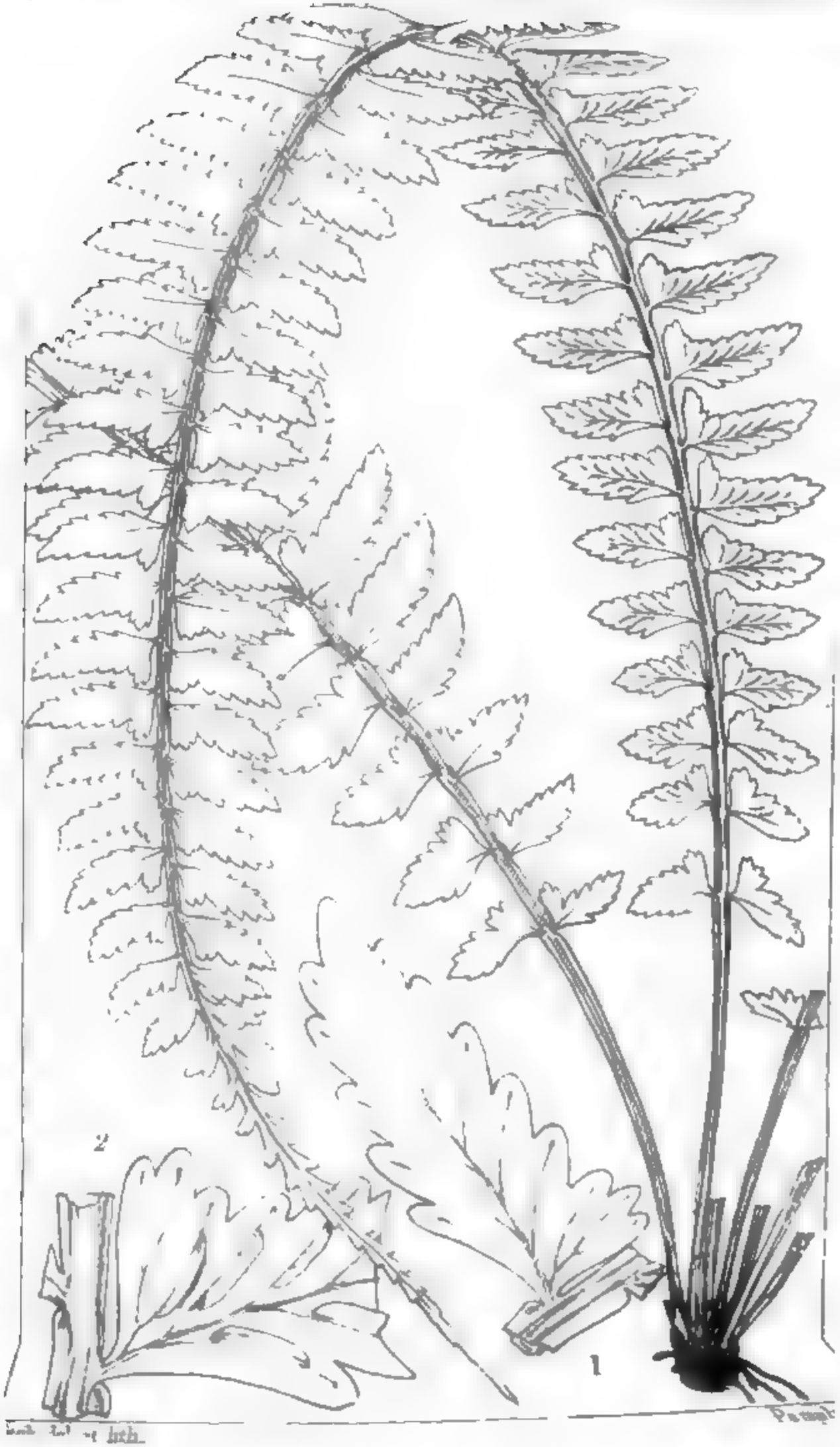
Tab. CLXXVI

Fitch del et lith

TAB. CLXXVII.

ASPLENIUM (EUASPLENIUM) PTEROPUS, *Klfs.*—p. 122.
Fertile frond; *nat. size*. Fig. 1. Sterile pinna. Fig. 2. Portion of a fertile pinna and of the rachis, *magnified*.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Tab. CLXXVIII.

Asplenium (Euasplenium) erectum, *Bory* —Var. *harpeodes*, *Metten.*—p. 127.

Fig. 1. Fertile frond. Fig. 2. Small var.; *nat size* Fig 3 and 4 Portions of a fertile pinna, *magnified*

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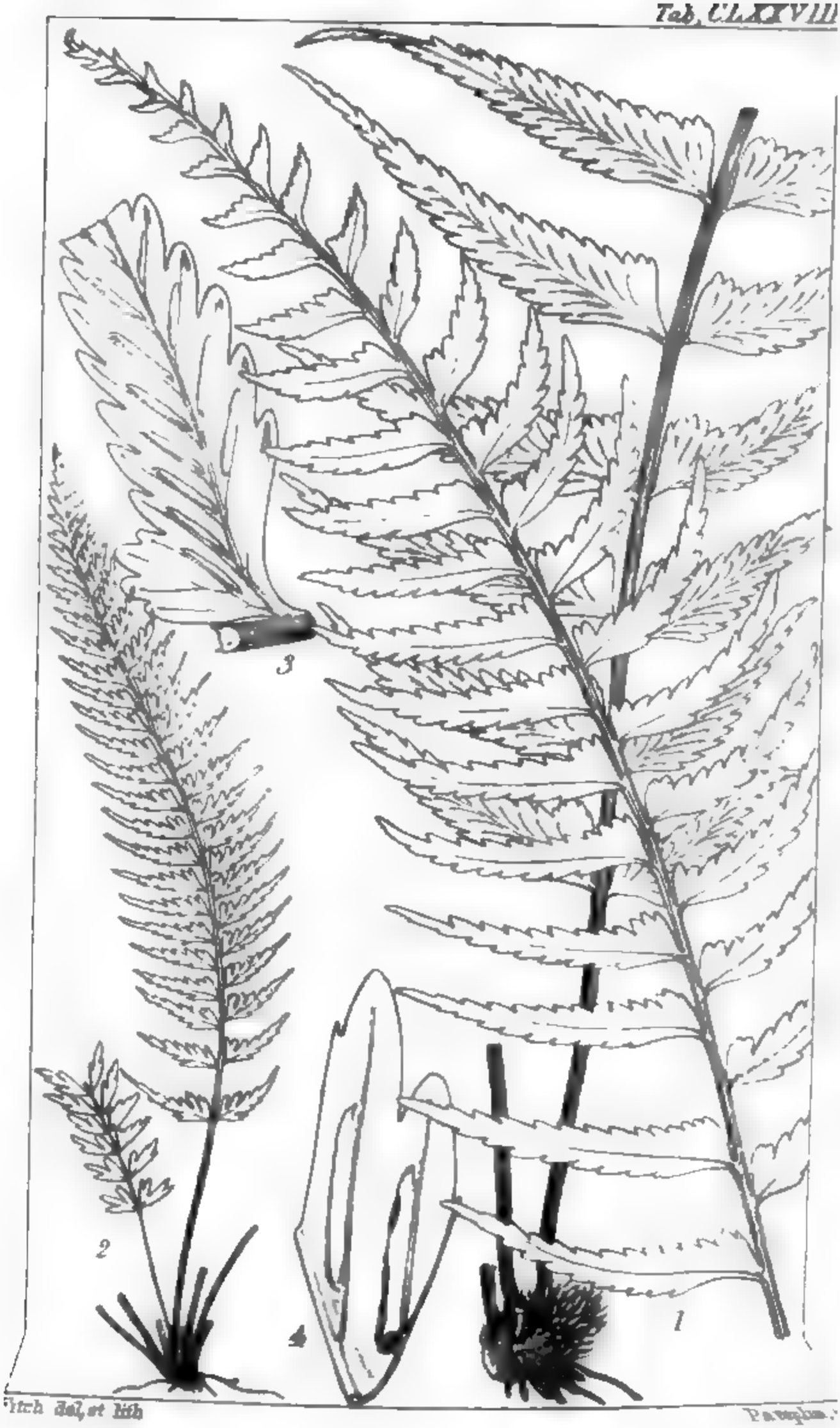
Tab. CLXXVIII



Fitch del. et lith.

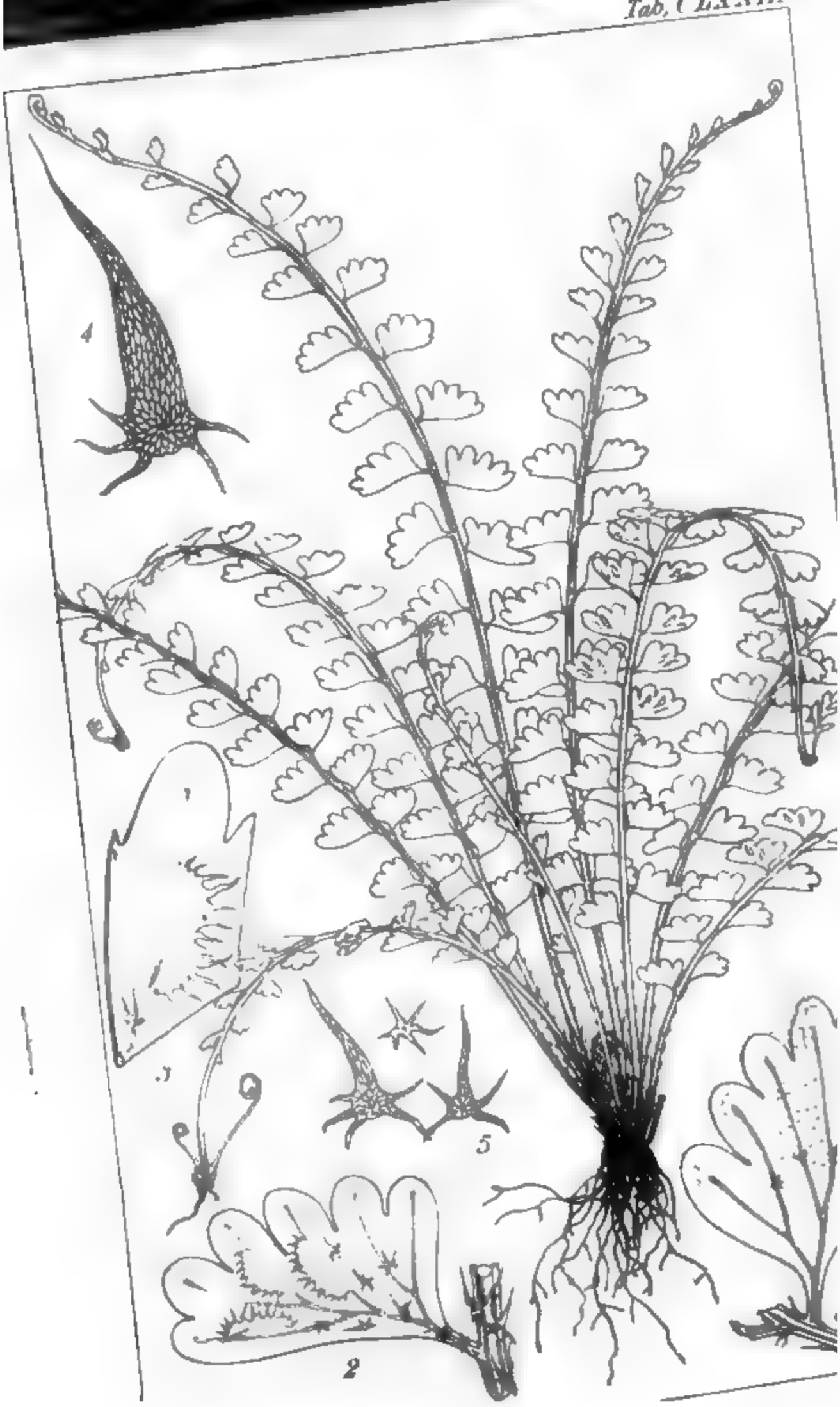
Pamphlet

Tab. CLXXIX.

Asplenium (Euasplenium) Sandpersoni, *Hook* —p 147

Fertile plant, *nat. size*. Fig 1. Sterile pinna. Fig 2. Fertile pinna Fig. 3. Soras Fig 4 and 5. Scales from rachis and veins beneath, *magnified*.

Tab. CLXXIX



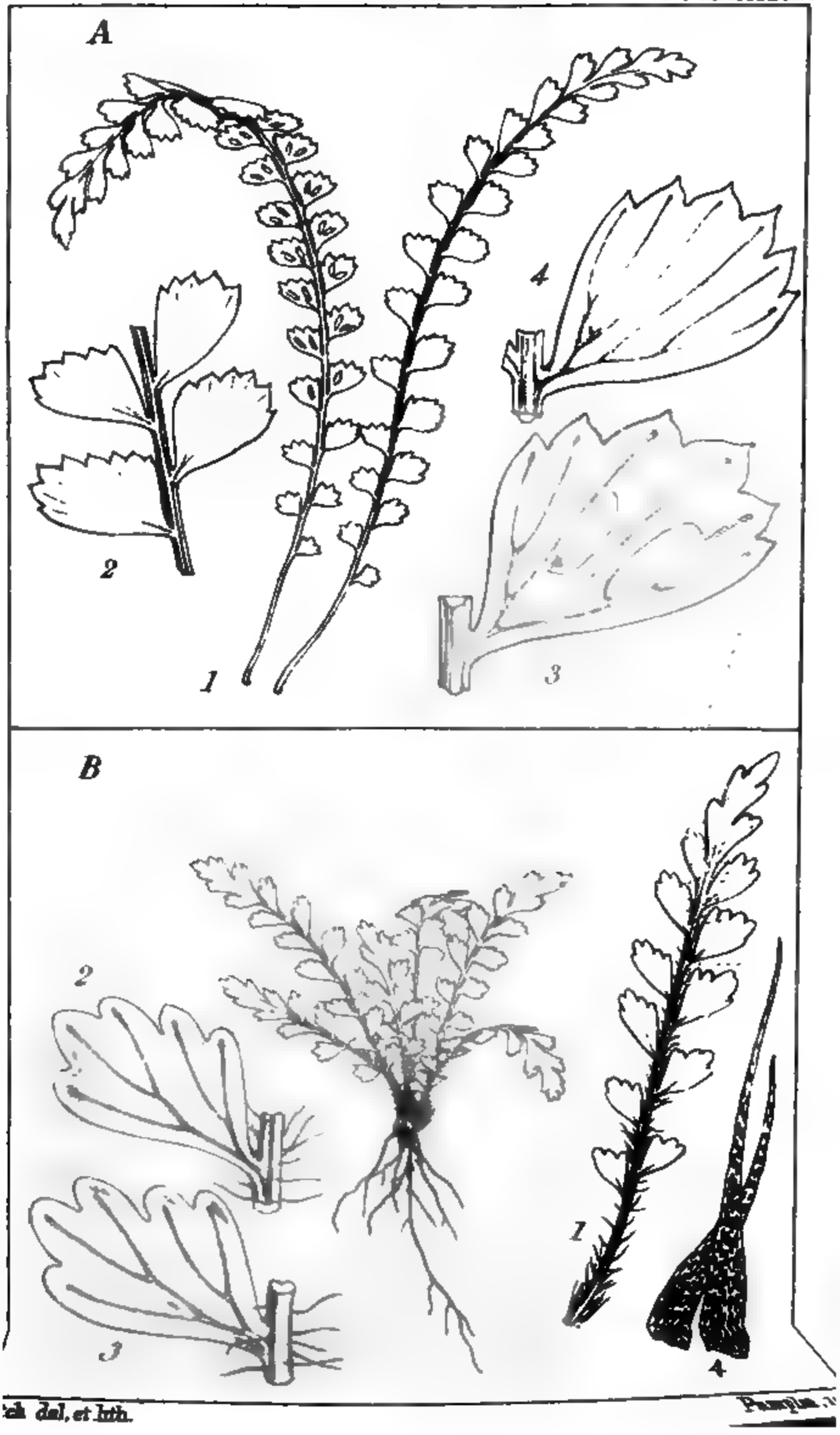
Tab. CLXXX.

A. Asplenium (Euasplenium) Kraussii, *Moore*.—p. 147.
Fig. 1. Fertile fronds, *nat. size*. Fig. 2, 3, 4. Sterile pinna and a fertile one; *magnified*.

B Asplenium pygmæum, *Hook*.—p. 147.
Plant, *nat. size*. Fig. 1. Sterile frond. Fig. 2 and 3. Sterile pinnæ. Fig. 4. Scales from the stipes, *magnified*.

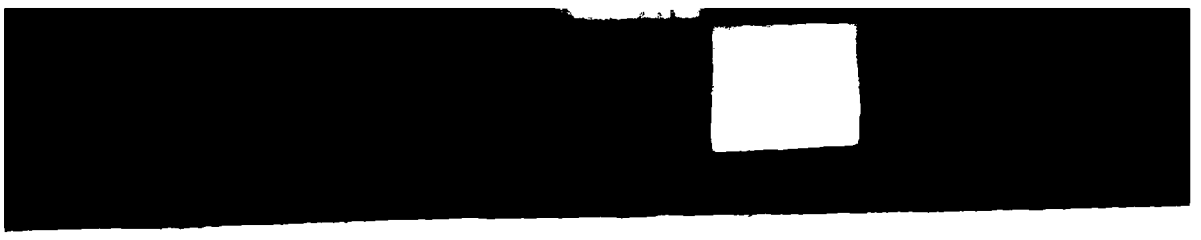
[redacted]

Tab. CLXXX.



ch del. et lith.

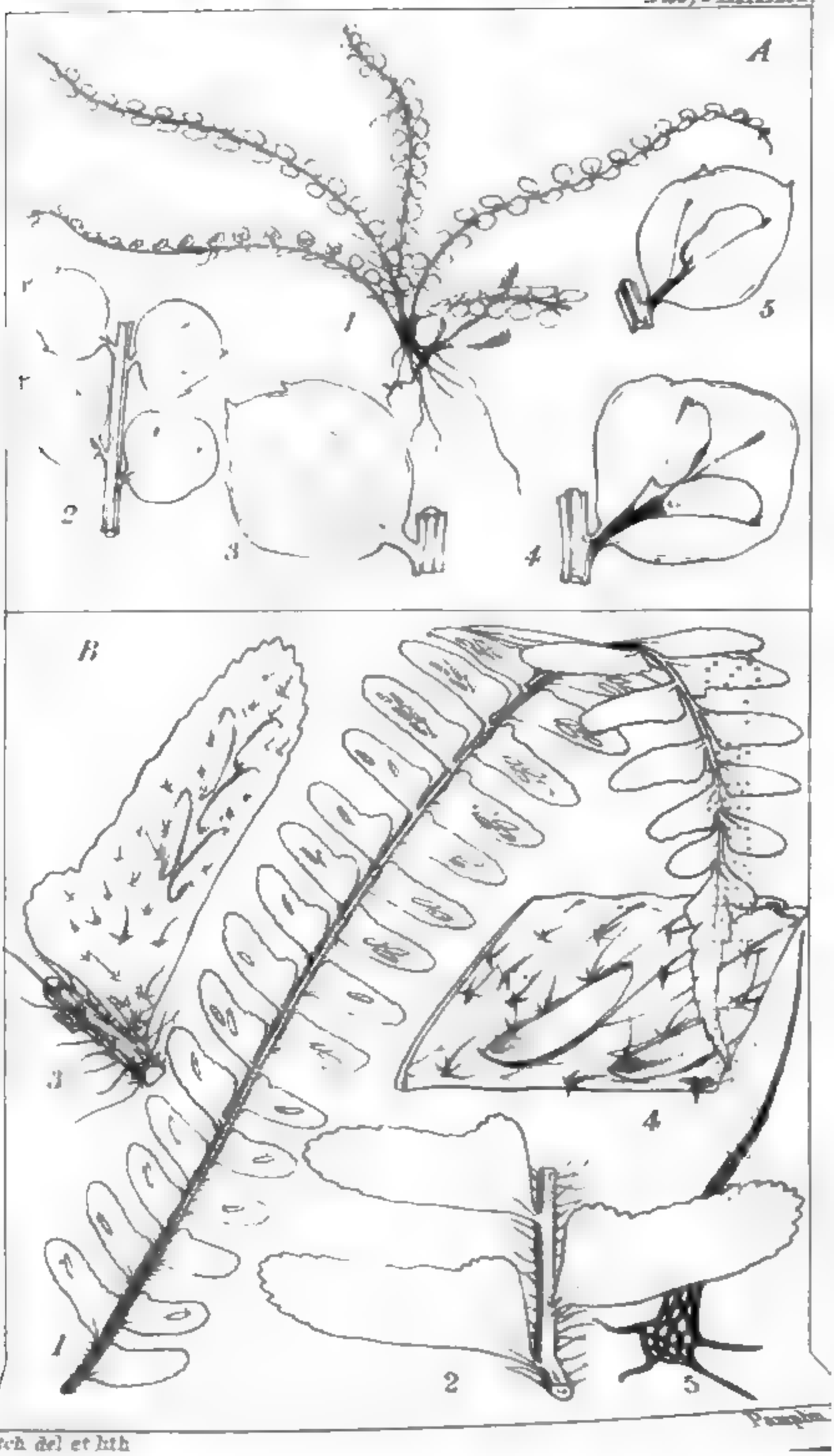
Pamplin



Tab. CLXXXI.

A. Asplenium projectum, *Kze.*—p. 148.
Fig. 1. Plant; *nat. size.* Fig. 2 Portion of a frond. Fig. 3, 4, 5. Pinnæ, fertile and sterile; *more or less magnified.*

B. Asplenium subavenium, *Hook.*—p. 143.
Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Pinnæ. Fig. 3. Single fertile pinna. Fig. 4. Sori; *magnified.*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B
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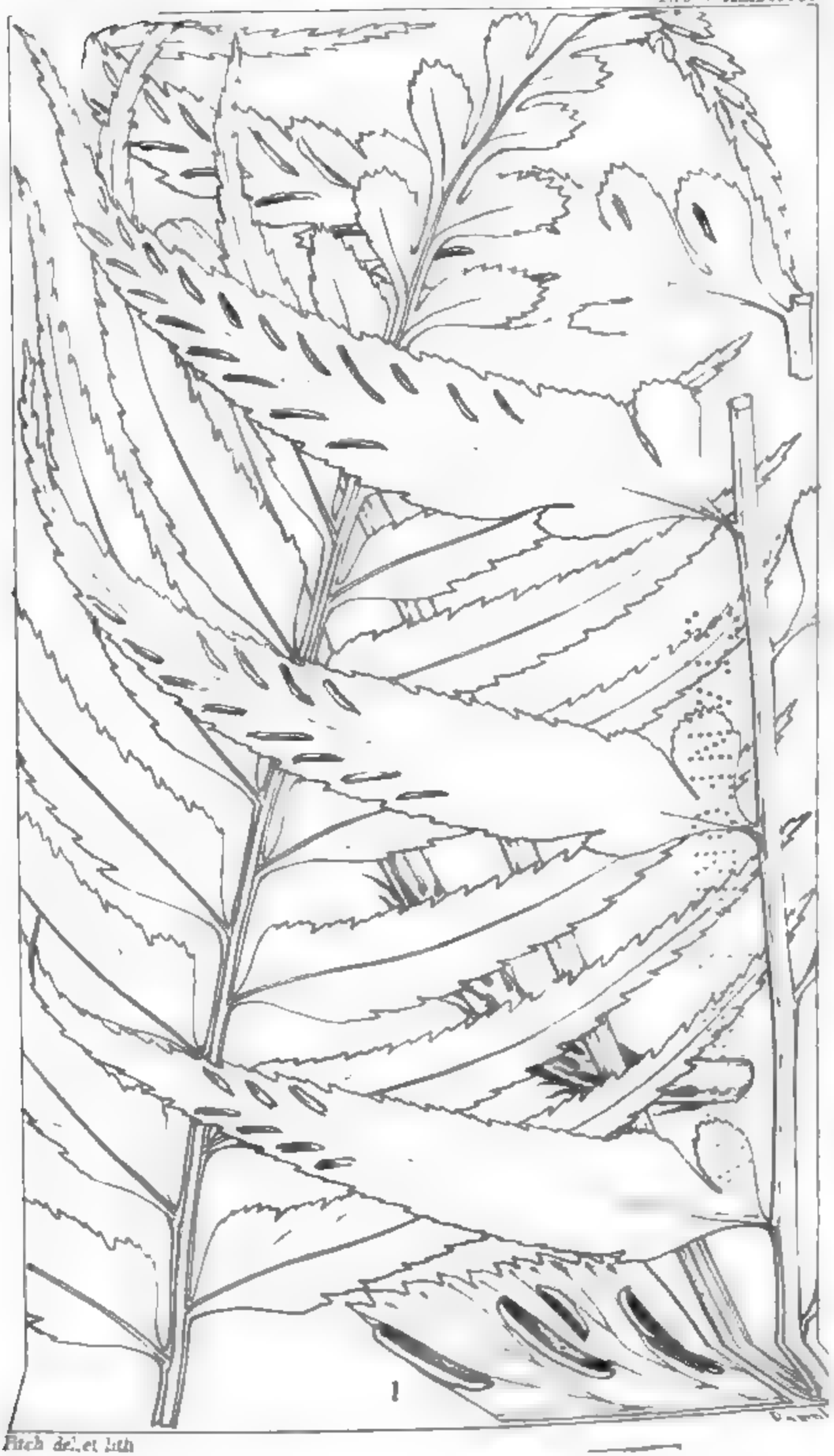
TAB. CLXXXII.

ASPLENIUM WRIGHTII, *Eat.*—p. 113.
Portions of fronds; *nat. size.* Fig. 1. Sori; *magnified.*



Fitch del. et lith

TAB. CLXXXIII.

ASPLENIUM MULTILINEATUM, *Hook.*—p. 102.
Fertile frond; *nat. size*. Fig. 1. Sori; *magnified*.

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Tab. CLXXXII

Fitch del, et lith

Pamph

TAB. CLXXXIV.

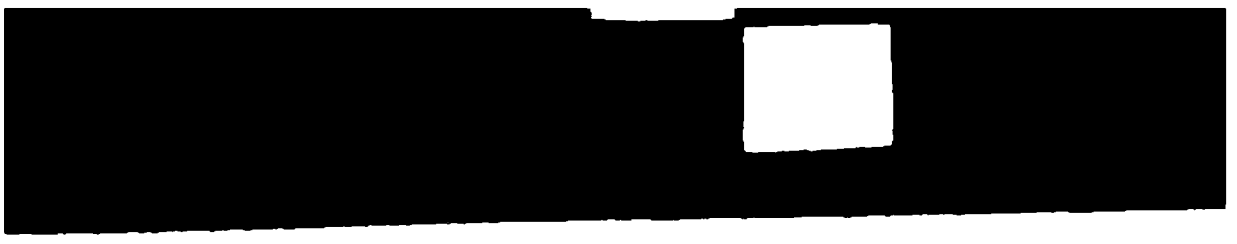
ASPLENIUM GAUTIERI, *Hook.*—p. 88.

Fertile plant; *nat. size.* Fig. 1. Portion of the frond, with sori, *magnified.*

Tab. CLXXXIV

Bitch del, et lith

Pamph



TAB. CLXXXV.

ASPLENIUM VARIABILE, *Hook.* — p. 93.

Plants, fertile and sterile; *nat. size.* Fig. 1. Portion of a frond, with sori, *magnified.*

Tab, CLXXXI

Fitch del et lith

TAB. CLXXXVI.

ASPLENIUM BORNEENSE, *Hook.*—p. 135.

Fertile frond, *nat size*. Fig. 1. Fertile pinna; *magnified*.

Fitch del et lith

[redacted]

TAB. CLXXXVII.

ASPLENIUM RHIZOPHORUM, *L.*—p. 122.

Fertile frond, pinnæ *A*, and *B*, *C*, *D*, varieties; *nat. size.*

Tab. CLXXXVII.

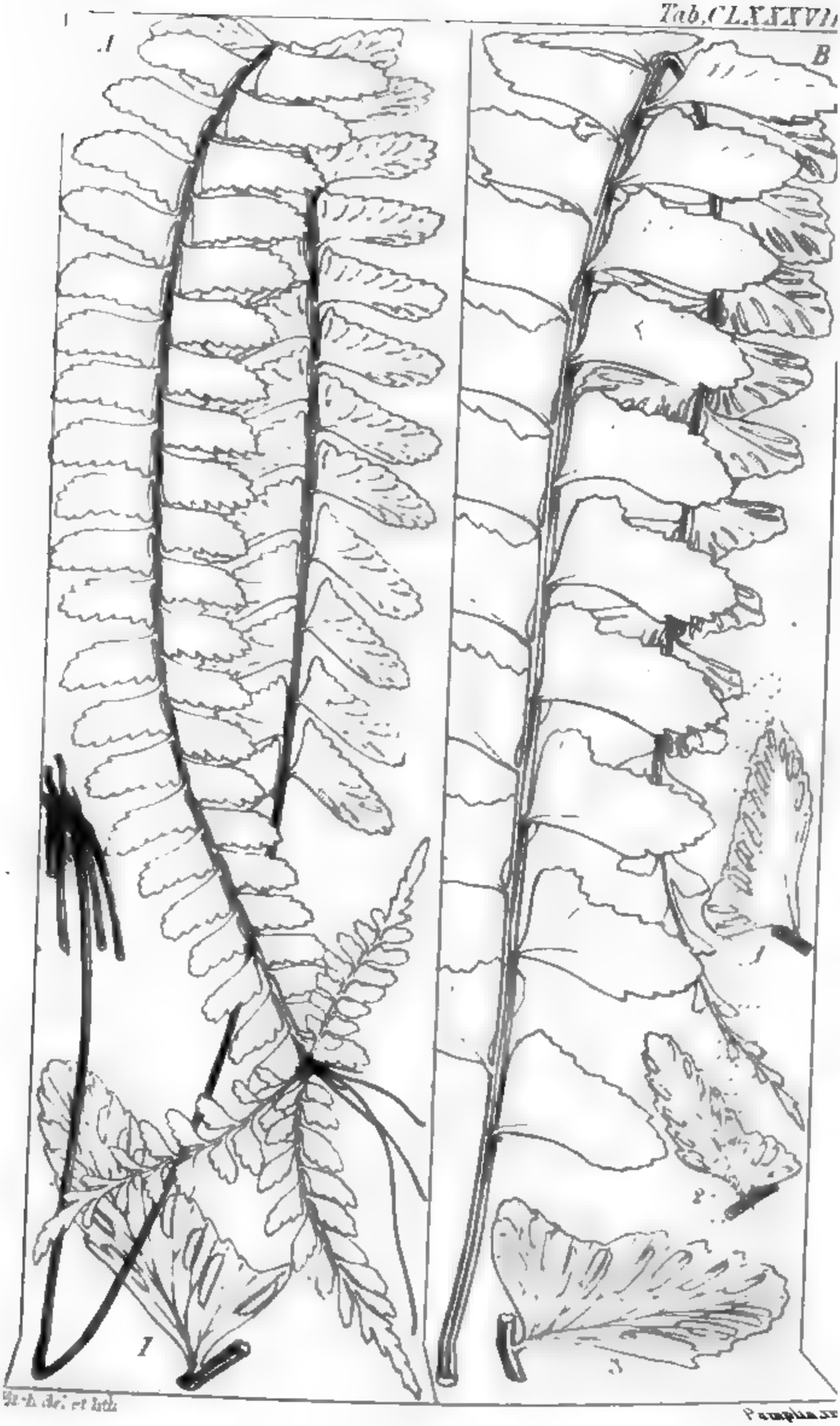
Fitch del et lith

[redacted]

Tab. CLXXXVIII.

A. Asplenium multijugum, *Wall.*—p. 139.
Fertile plant; *nat. size.* Fig 1. Fertile pinna; *magnified.*

B. Asplenium multijugum, *Wall. β.*—p. 140.
Fertile plant; *nat. size.* Fig. 1, 2. Fertile pinnæ of varieties; *nat. size.* Fig. 3. Fertile pinnæ, with sori; *magnified.*


A
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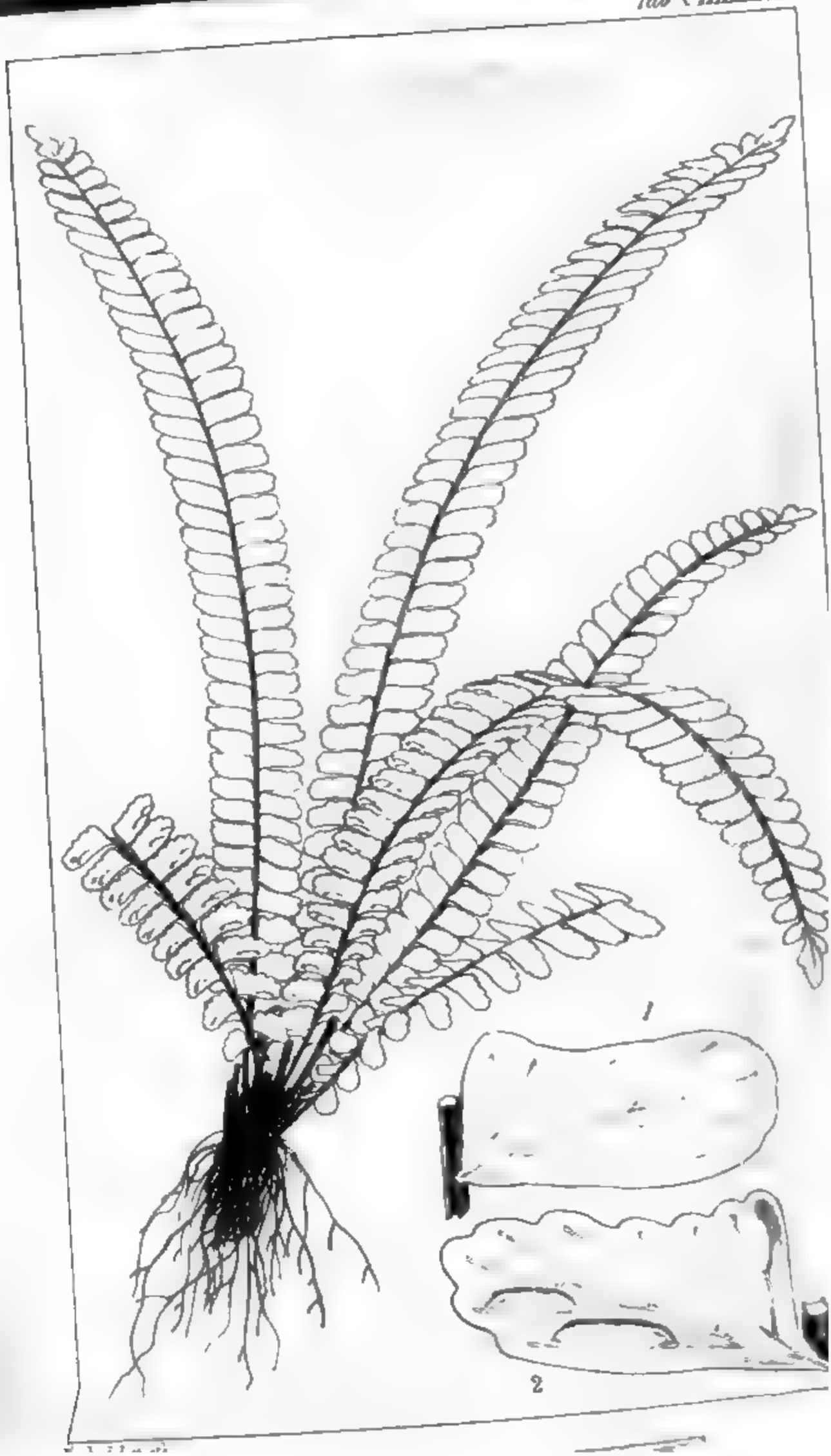
TAB. CLXXXIX.

ASPLENIUM ARCUATUM, *Liebm.*—p. 142.

Fertile plant; *nat. size.* Fig. 1, 2. Sterile and fertile pinnæ; *magnified.*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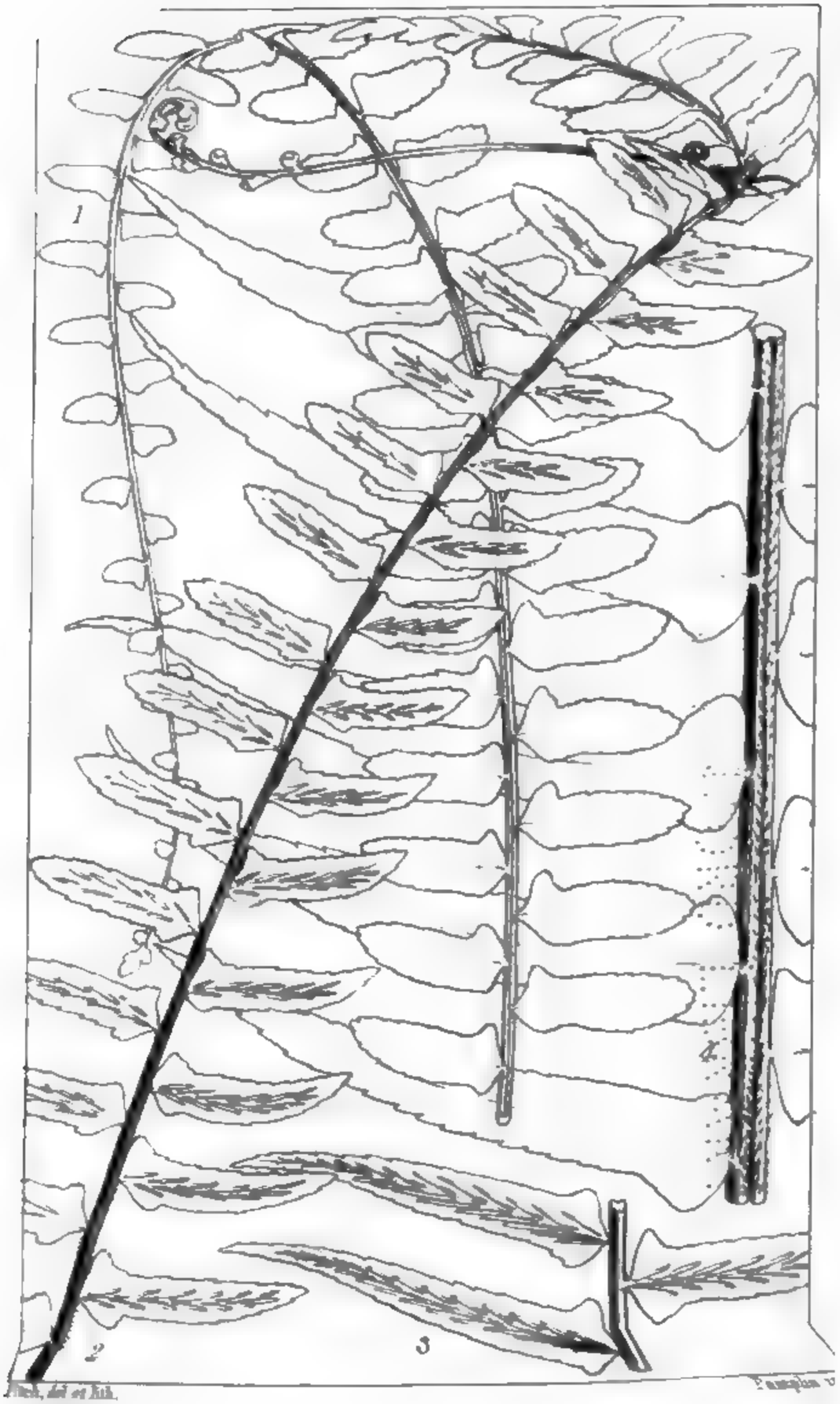
TAB. CXC.

ASPLENIUM LONGISSIMUM, *Bl.*—p. 148.

Fig. 1. Apex of a frond, ordinary form. Fig. 2. Fertile apex, proliferous. Fig. 3. Fertile, intermediate pinnæ. Fig. 4. Base of a fertile pinna, *all nat. size.*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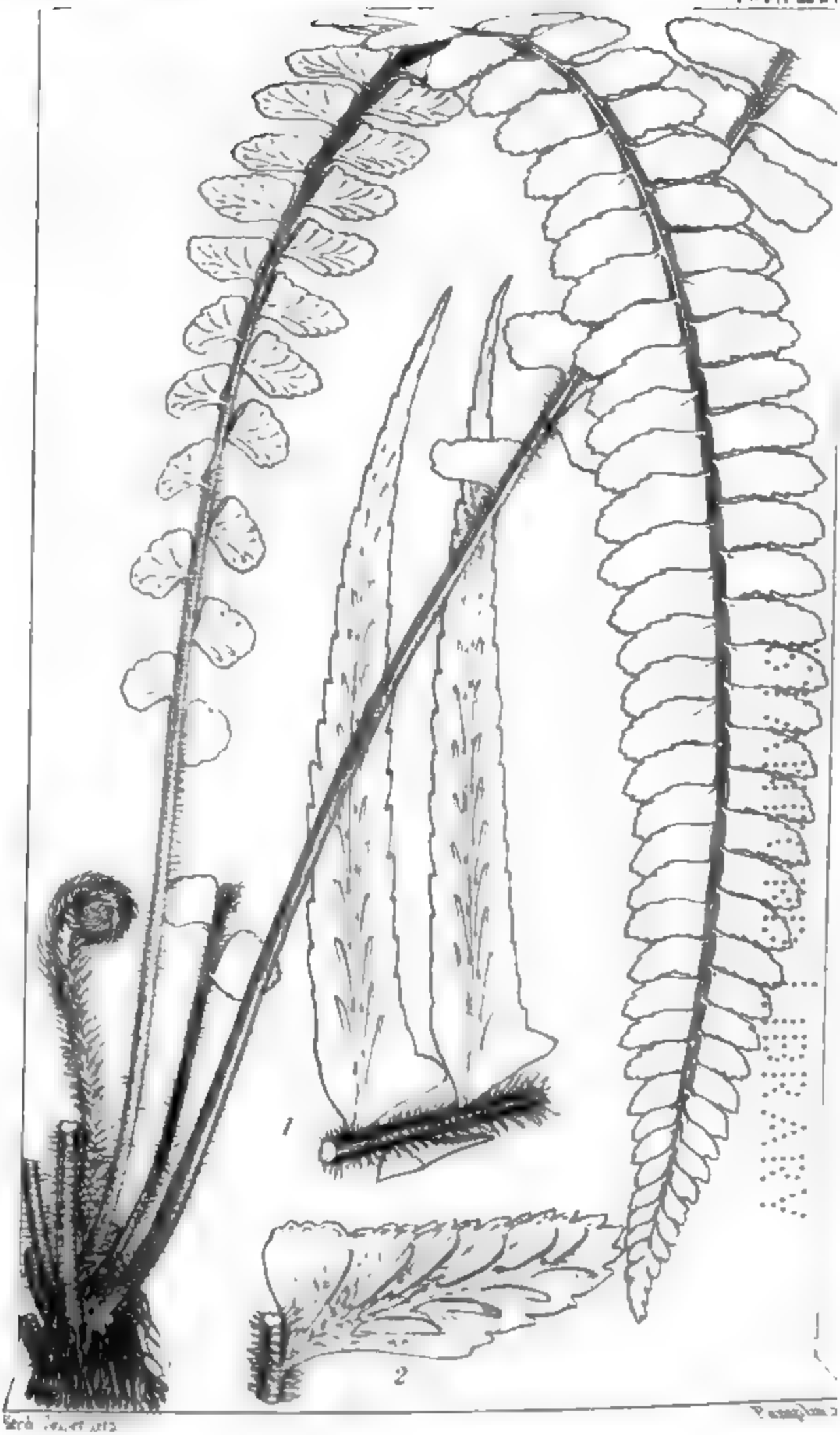
Tab. CXCI.

Asplenium hirtum, *Kit.* –p. 149.

Fertile plant; *nat. size.* Fig. 1. Fertile pinnæ, more than usually elongated. Fig. 2. Pinna of an ordinary form, but scarcely auricled; *magnified.*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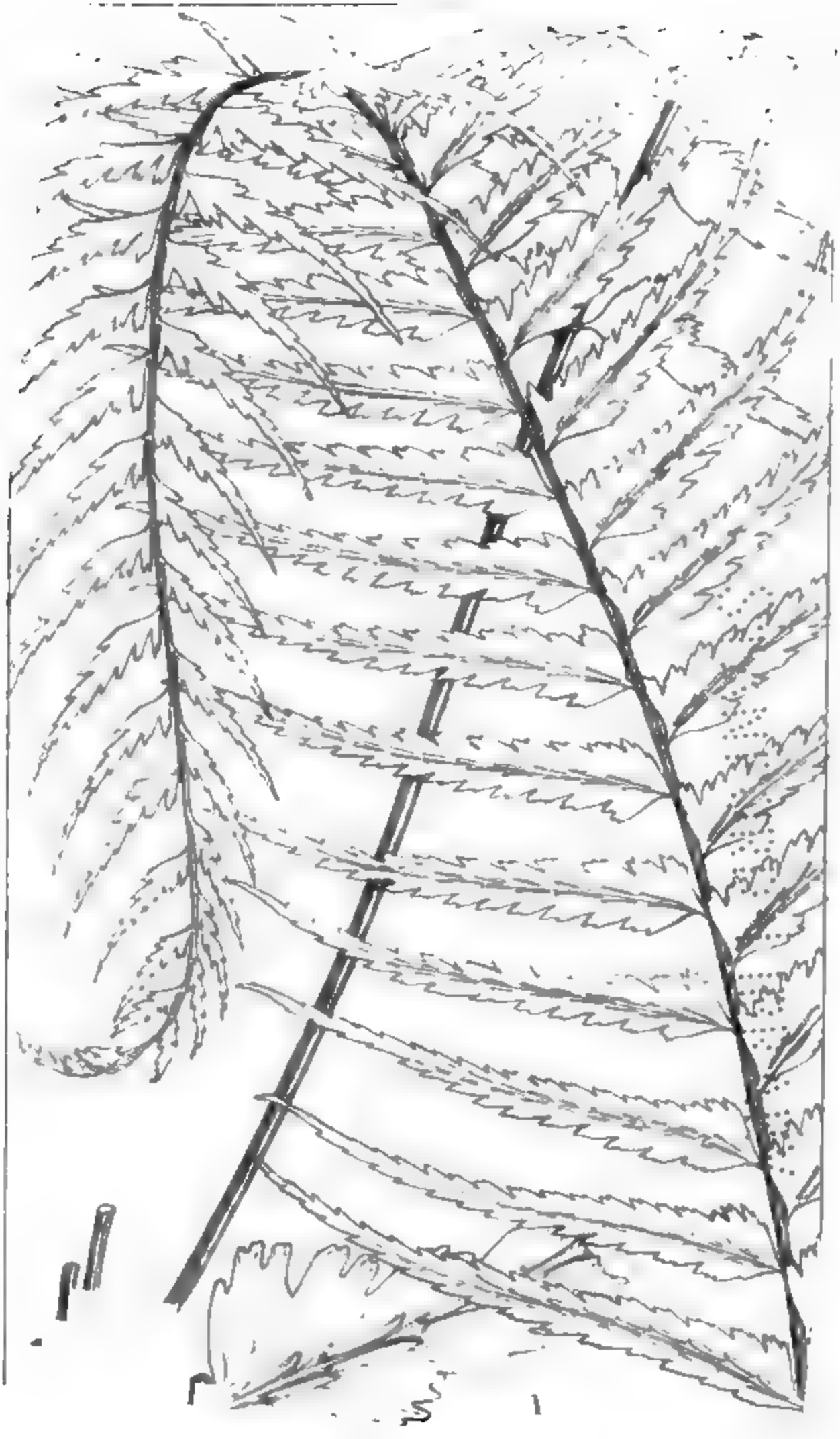
TAB. CXCII.

ASPLENIUM BISSECTUM, *Sw.*—p. 151.

Fertile plant; *nat. size.* Fig. 1. Portion of a pinna, with sori; *magnified.*



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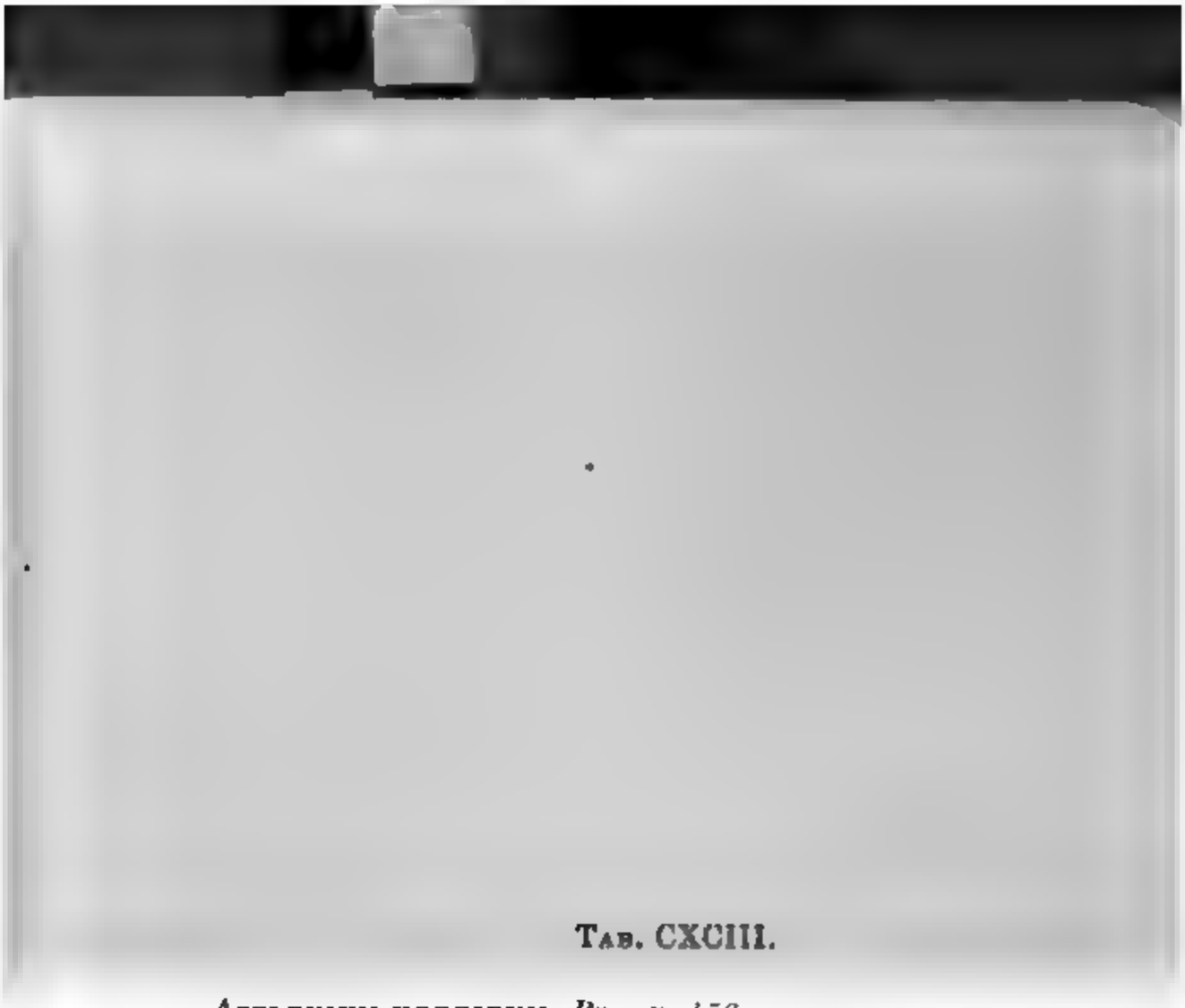
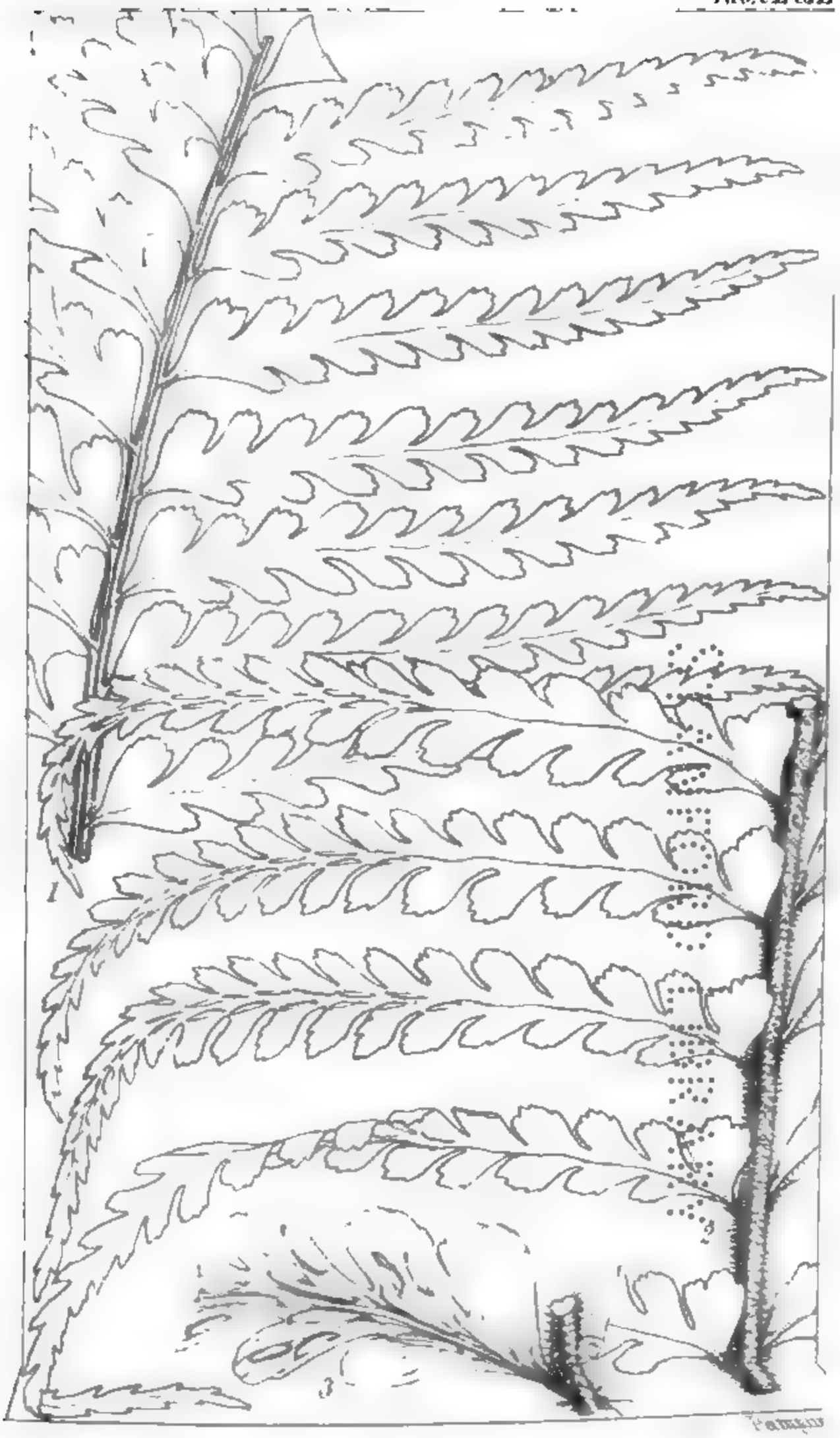


Tab. CXCIII.

Asplenium horridum, *Pr.*—p. 153.

Fig. 1. Portion of the upper half of a fertile frond. Fig. 2. Portion of the lower half of a fertile frond; *nat. size.* Fig. 3. Base of a pinna, with sori; *magnified.*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Tab. CXCIV.

Asplenium contiguum, *Kaulf.*—p. 156.

Fig. 1. Caudex, stipes, and lower pinnæ of a frond. Fig. 2, 3, 4. Pinnæ of var. *filiforme*. Fig. 5. Pinnæ of var. *lepturus*. Fig. 6 and 7. Other forms of pinnæ, from different fronds; *all nat. size*. Fig. 8. Base of a pinna, with sori, *magnified*.

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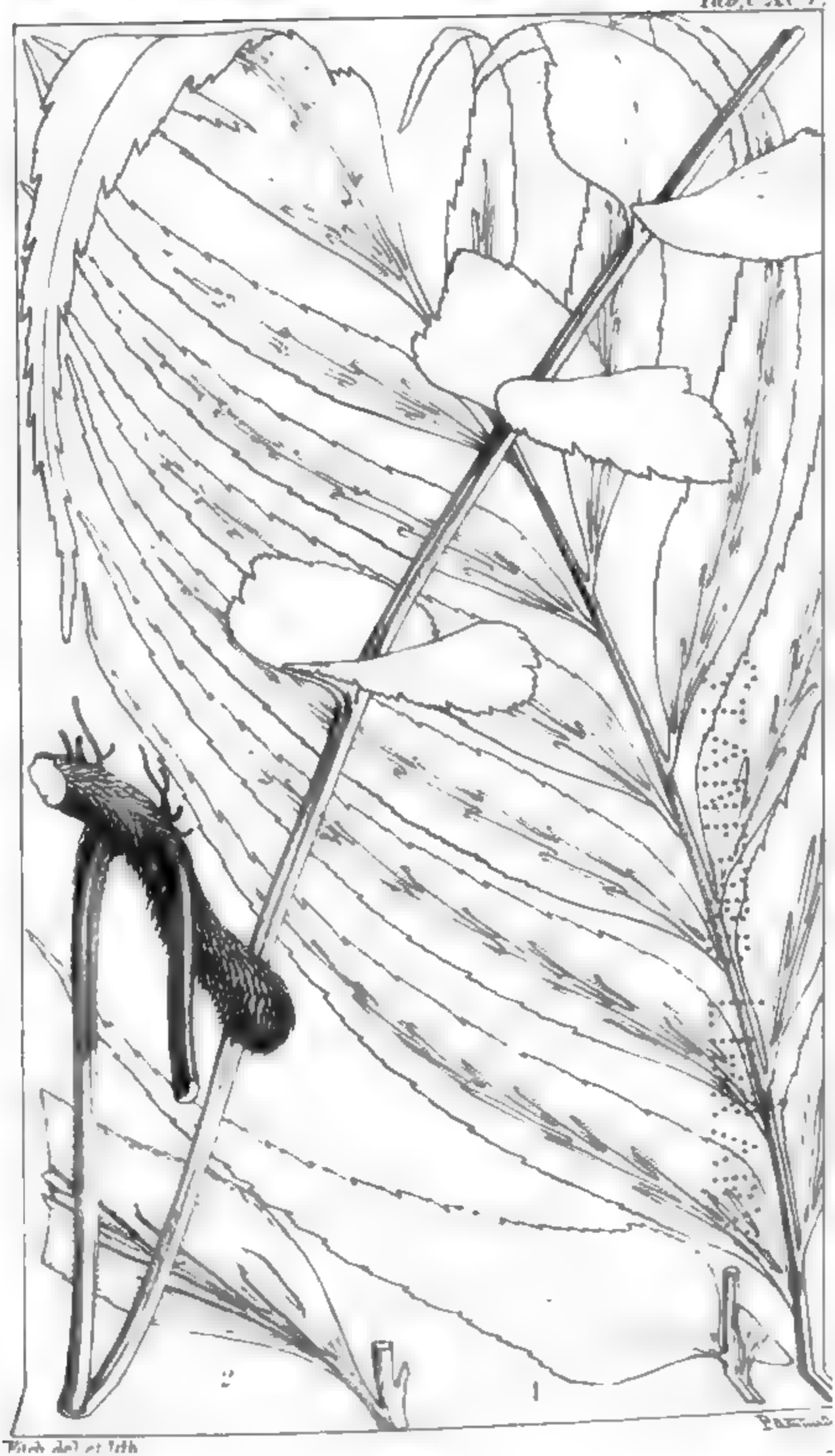
Tab. CXCV.

Asplenium nitens, *Sw.*—p. 157.

Caudex, stipes, and frond. Fig. 1. Broader pinna, from another frond; *nat size*. Fig. 2. Base of a pinna, with sori; *magnified*.



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Tab. CXCVI.

Asplenium macrophyllum, *Sw.*—p. 158.

Caudex, stipes, and frond; *nat. size.* Fig. 1. Narrower form of pinna; *nat. size.* Fig. 2. Portion of a pinna, with sori, *magnified.*

2
1

Tab. CXCVII.

Asplenium macrophyllum, *var.* urophyllum, *Hook.*—p. 159

Fertile frond, *nat size* Fig. 1. Upper side a pinna, *slightly magnified*. Fig. 2. Base of a pinna, with sori; *more magnified*

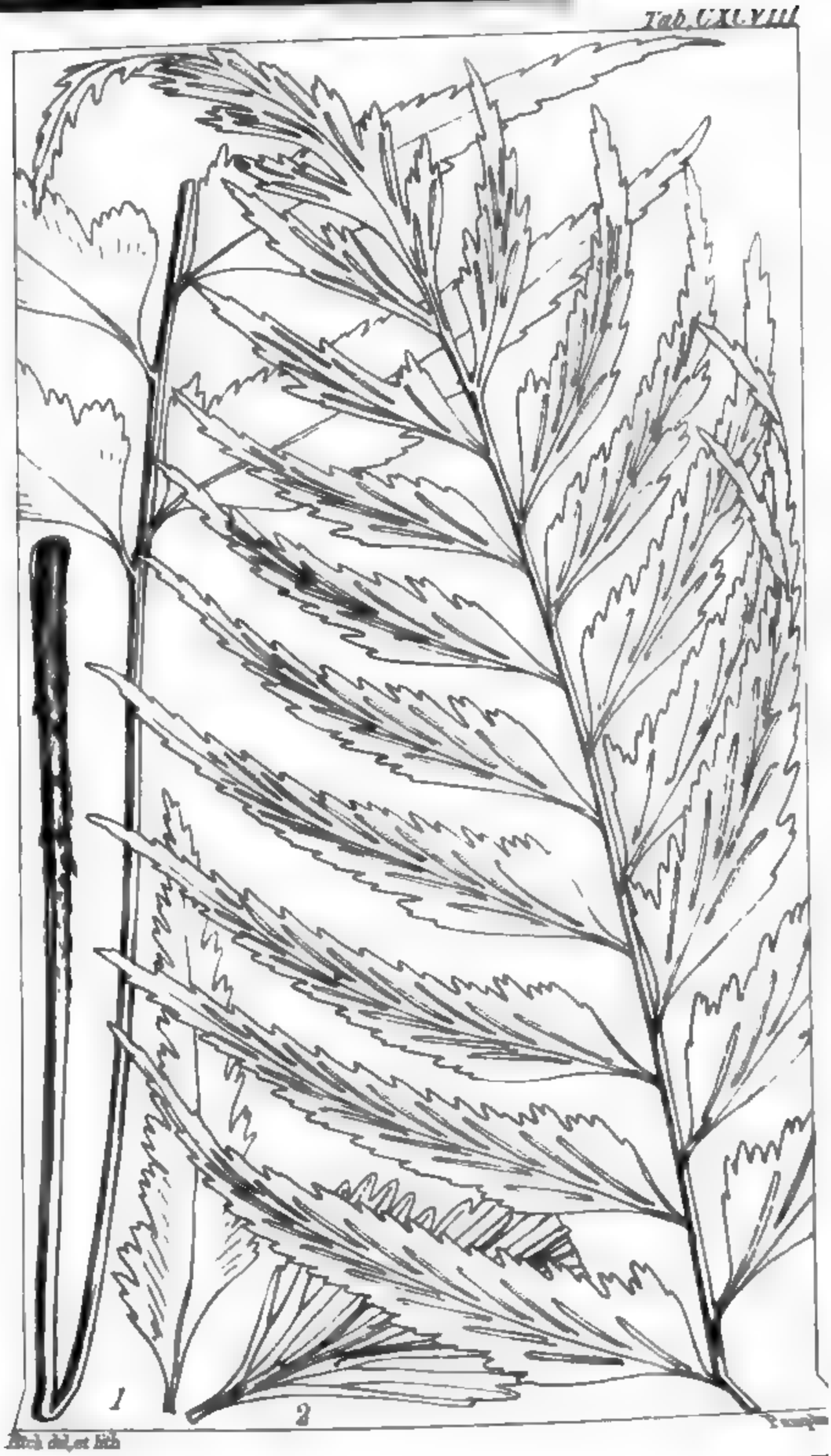
Tab. LXCVII.

Tab. CXCVIII.

Asplenium erosum, *L.*—p. 162.

Fertile frond; *nat. size.* Fig. 1. Pinna of a variety

Fig. 2. Base of a pinna, with sori; *magnified.*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Tab. CXCIX.

Asplenium paleaceum, *Br.*—p. 162.

Fertile tuft of fronds ; *nat. size.* Fig. 1. Pinna, with sori ; and Fig. 2. Scales of the under side of the pinnæ ; *magnified.*

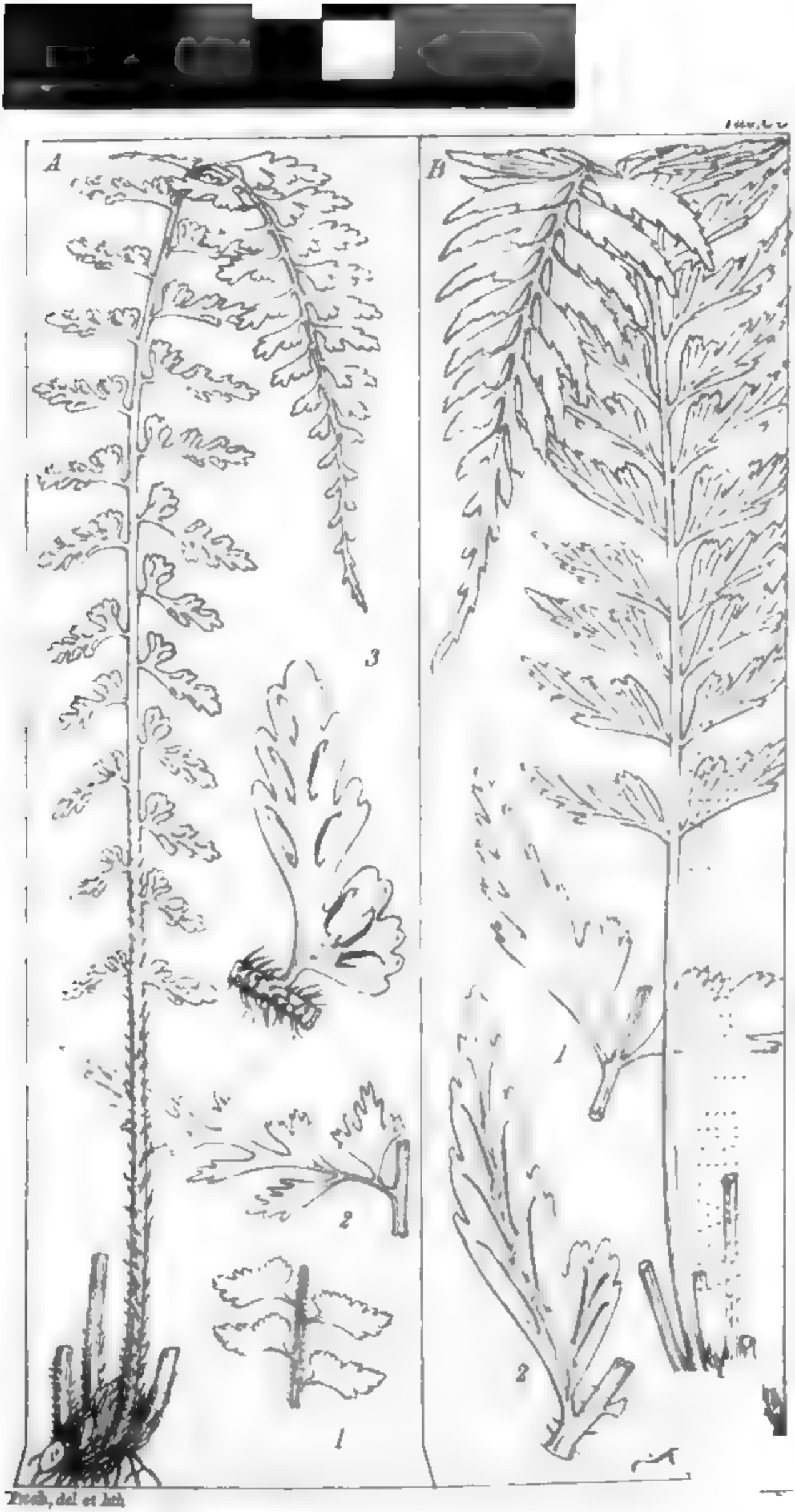
2
1

[redacted]

Tab. CC.

A. Asplenium laciniatum, *Don.*—p. 164.
Fig. 1. Fertile plant; *nat. size.* Fig. 1 and 2. Variations
pinnæ from different fronds; *nat. size.* Fig. 3. Ferti
pinna, ordinary form, with sori, *magnified*

B. Asplenium planicaule, *Wall.*—p. 163.
Fertile plant; *nat. size.* Fig. 1. Sterile pinna, *slightly ma*
nified. Fig. 2. Pinna, with sori; *more magnified*


A
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Tab. CCI.

Asplenium solidum, *Kze.*—p. 167.

Plant; *nat. size.* Fig. 1. Pinnule. Fig. 2. Sorus; *magnified.*

1
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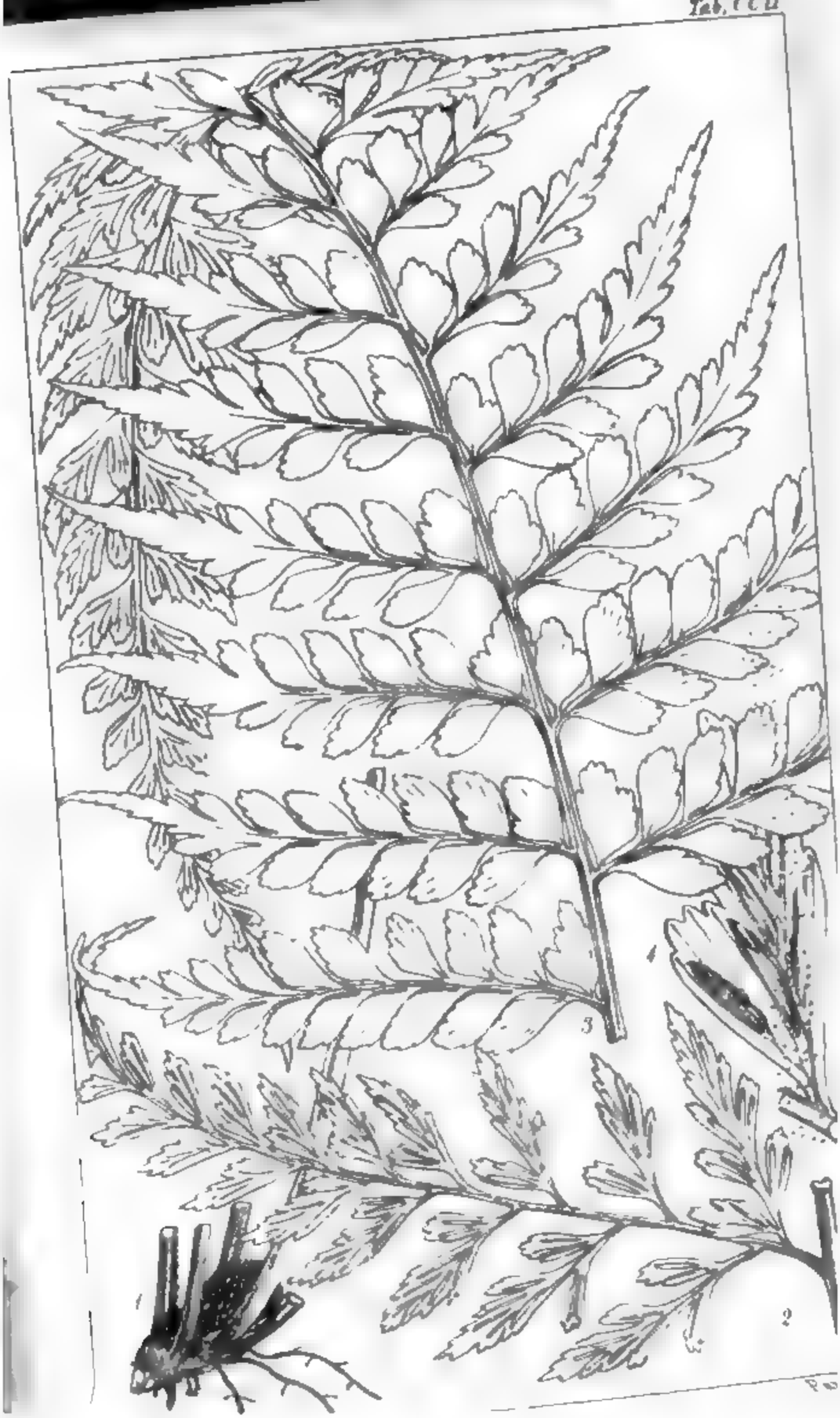
[redacted]

Tab. CCII.

Asplenium affine, *Sw.*—p. 169.

Fig. 1, 2, and 3. Portions of a fertile plant; *nat. size.* Fig. Pinnule, with sori; *magnified.*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TAB. CCIII

ASPLENIUM LASERPITIIFOLIUM, *Lam.*—p. 172.

Fig. 1 and 2. Portions of a fertile plant; *nat. size.* Fig. 3 Pinnule, with sori; *magnified.*

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[redacted]

Tab. CCIV.

Asplenium scandicinum, *Kfs.*—p. 183.

Fertile plant; *nat. size.* Fig 1. Pinnule, with sori; *magnifi*

Tab. CCV

Asplenium Jamesoni, *Hook.*—p. 184.

Fig. 1 and 2. Portions of a fertile plant; *nat. size.* Fig. 3. Portion of a pinnule; *magnified.*

TAB. CCVI.

ASPLENIUM ACUMINATUM, *Hook. et Arn.*—p. 183.

Fig. 1 and 2. Fertile plant; *nat. size.* Fig. 3. Pinnule, with sori; *magnified.*

3
2

Tab. CCVII.

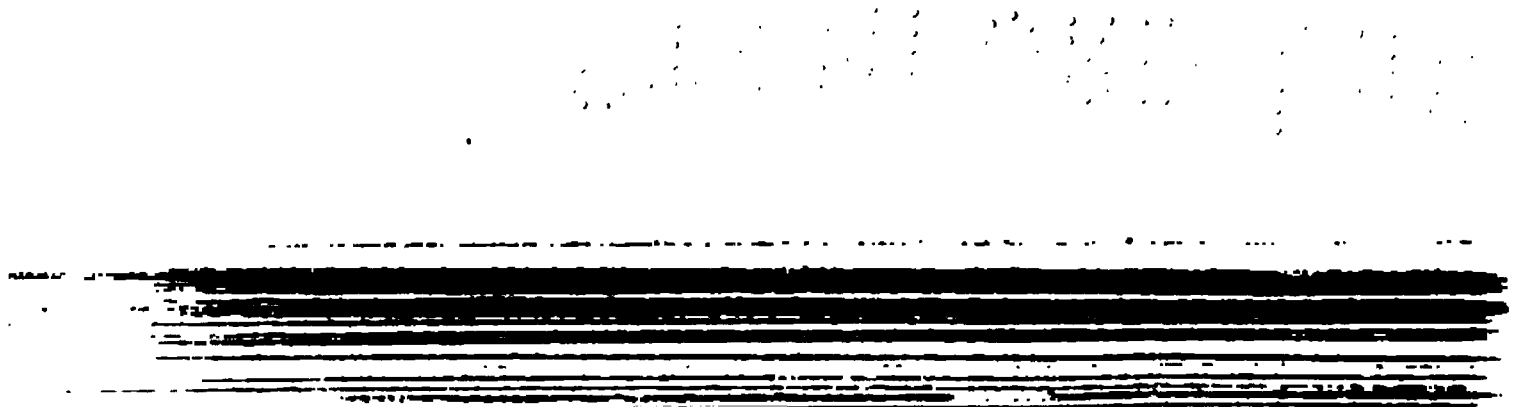
Asplenium (Eudiplazium) Cubense, *Hook.*—p. 253.
Fertile fronds; *nat. size.* Fig. 1. Portion of a pinna, *magnified.*

Tab. CCVIII.

Asplenium bipartitum, *Bory.*—p. 178.

Fig. 1 and 2. Portions of pinnæ, with sori; *magnified.* Fig. 3 and 4. Fertile plant; *nat. size.*

(The figure here given shows that this species might with as much propriety be placed among the *Eudiplazia* or the *Euasplenia*, and near *Aspl. Cubense*.)



TAB. CCIX.

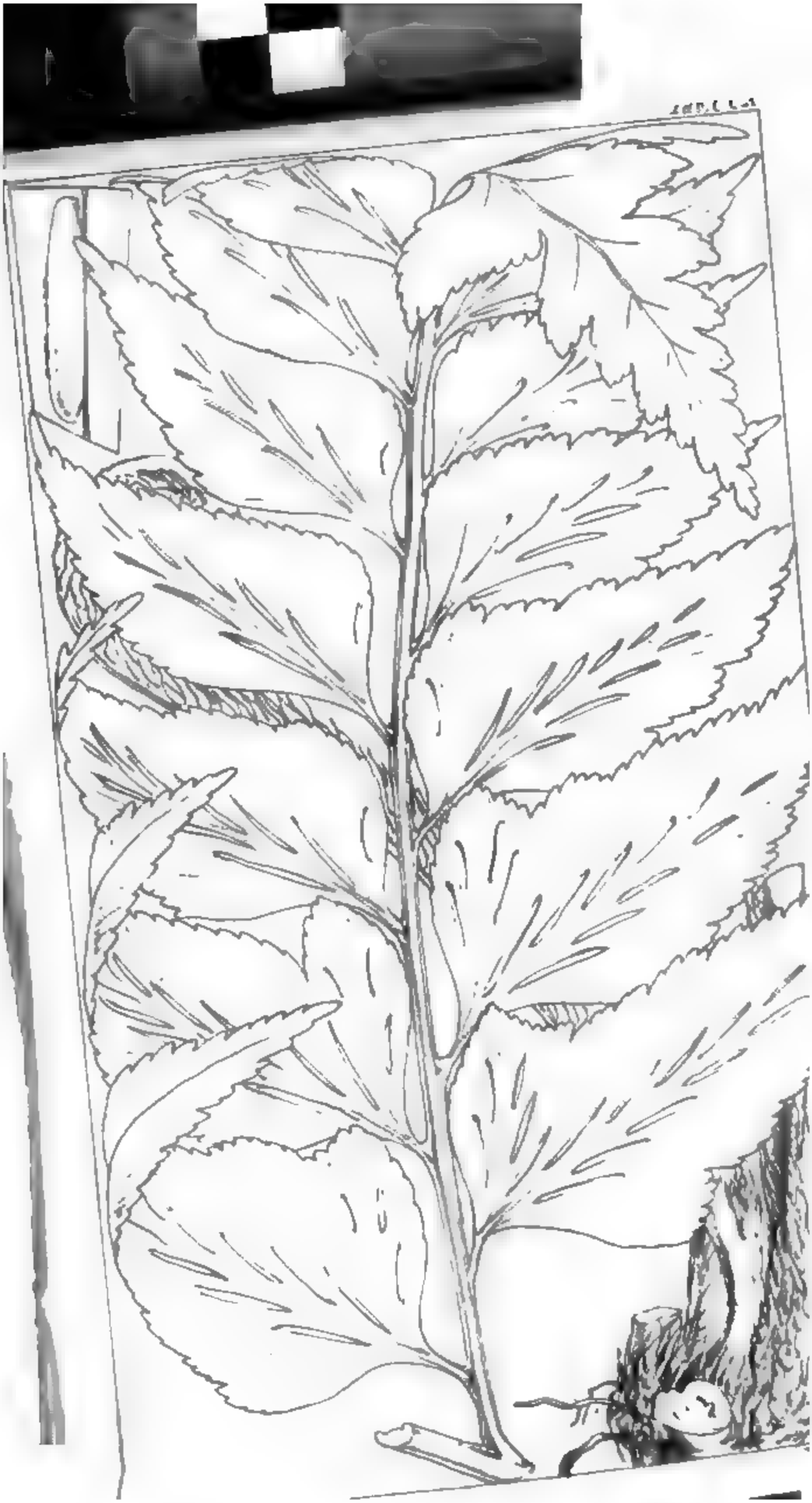
ASPLENIUM LINDENI, *Hook.*—p. 185.
Fertile frond; *nat. size.* Fig. 1. Sorus; *magnified.*

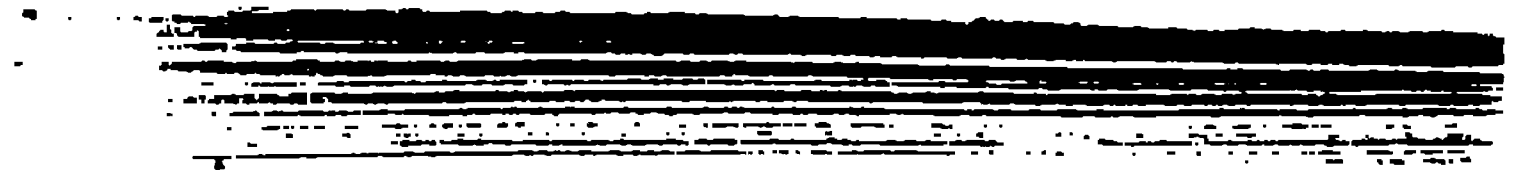
Tab. CCIX.

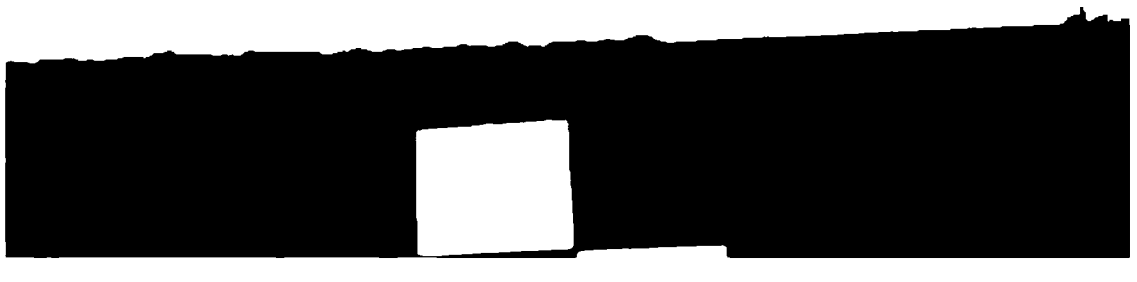
TAB. CCX.

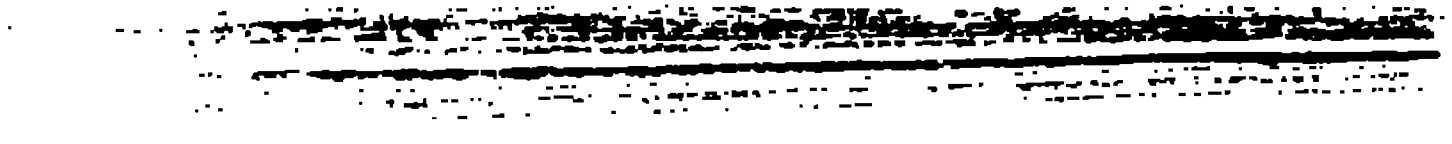
ASPLENIUM SQUAMOSUM, *L.*—p. 186.

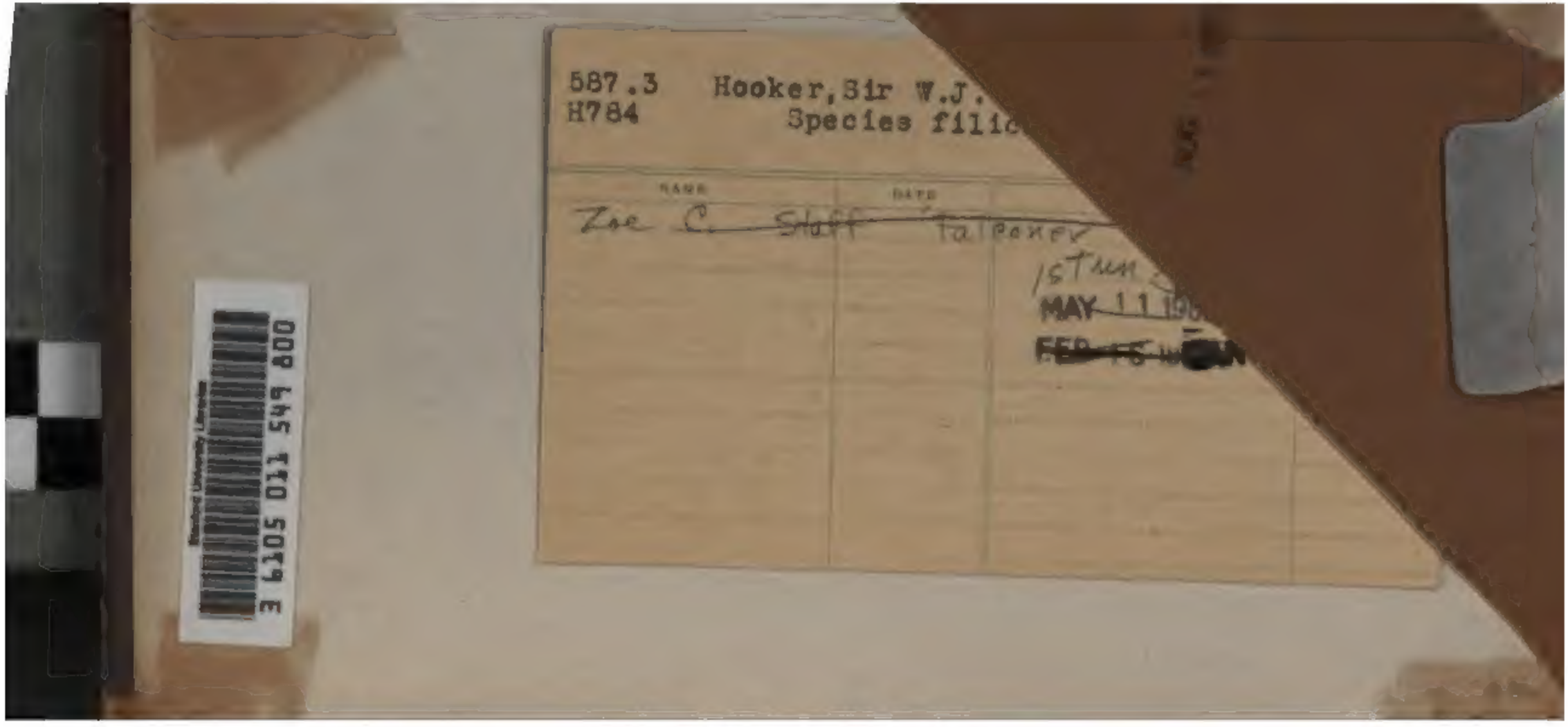
Portion of the very scaly caudex (with a young, circinate, scaly frond), and portion of a fertile frond; *nat. size.* Fig. 1. Sorus; *magnified.*











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